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STEEL ALLOCATIONS

and

What We Are Doing About Them

As you know, the Steel Products Advisory Committee recently agreed to a six month extension of voluntary allocations of steel for most industries already included in the allocation program—and the President has now asked for authority to establish priorities and allocations for key materials in short supply. On the face of it, this action and stepping up of steel requirements for defense and the Marshall Plan point toward a continuation of peak demand for steel.

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Compromising with Defense

THE President has just delivered his annual budget message. It contained no surprises. The total amount and the major items had been pretty well anticipated. However, in the allocation of budget outlay a certain executive complacence creeps in which makes one wonder if the man in the White House adequately grasps the realities of the period.

The problem at the head of the list is the threat to this country and to our way of life posed by the ideology of communism and by the nation which uses this ideology as an instrument of aggression.

By the unmistakable language of action no less than by the printed and spoken word, Russia has served notice of an implacable hostility. She rejects the civilized concept of live and let live. Her leaders postulate an ultimate and inevitable struggle of survival with the free world beyond the iron curtain. Holding this antagonism to be irreconcilable, she is preparing herself accordingly, a fact which must be clear to the President beyond any doubt.

A comparison of the Russian defense budget with our own may be pertinent. Truman proposes an outlay of $14.3 billion with provision for a 48 instead of a 70 group air force. Reliable Pentagon sources indicate that the Soviet has allocated 132 billion rubles for military purposes. This figure labors under obvious limitations. It does not include the contributions of the satellite states nor does it allow for the toil of millions of slaves who labor on defense projects.

Nevertheless the figure of 132 billion does have a meaning. Translated into dollars on the basis of nominal exchange rates, it is equal to 26 billion. Our soldier statisticians tell us that a comparable military establishment in this country would cost 36 billion dollars. Another approach is in terms of allocated national income. The Soviet military budget accounts for 29 per cent of Russian income, the American for 6.7 per cent. A similar effort by the United States would involve the total exclusive application to defense of all revenues—federal, state and local—plus another 20 per cent.

It should be noted that such a burden constitutes a much more severe strain upon the Soviet because living standards are lower and national product much smaller. The evidence indicates that ten Russians live on the income that sustains a single American, that productivity is correspondingly low.

In view of this effort by our self-proclaimed foe, is it wise to economize on an adequate air force, as the President is doing? Does it represent a prudent apportionment of the federal revenue to boost the outlay for welfare objectives while paring the allowance for self-defense?

Off-the-cuff statements that an important group in Russia wants peace, the ill-advised proposal to send Vinson to Moscow, the disregard of the Chinese collapse, the resistance to investigation of communist influence in the government, and finally the appointment of Dean Acheson about whose attitude toward the Reds there is some doubt, added to the budgetary paring of vital defense items, suggest a dangerous disposition to compromise with American safety and appease an aggressor whose intentions cannot be doubted.

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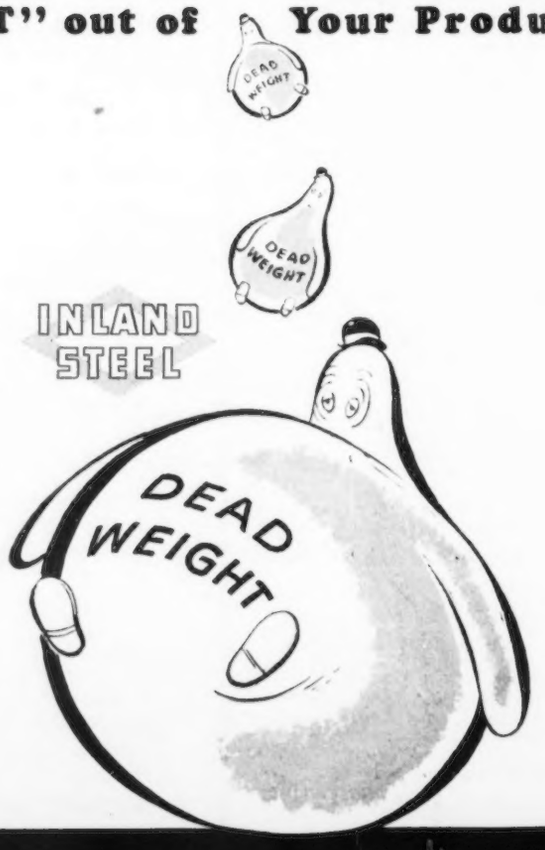

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► If Washington really finds a need for more steel capacity, one steel official says they can get it a lot quicker by adding facilities at individual mills for a cost of less than $50 a ton rather than by building new plants at $300 a ton--assuming in either case that the raw material problem can be licked. "It also depends," he quipped, "on whether Washington wants steel or socialism."

► For accurate spiral and radial relief in cutting tools, a form relief grinding fixture has been developed that can be fitted to any universal tool grinder. Radial or diameteral relief is controlled by one sine bar and helical or spiral relief by another sine bar on the fixture. Change gears make possible cutting from one to six flutes in a tool and teeth are cut in a true circle. After the form has been ground, a relief actuating mechanism is engaged and the tool is relieved without spiral cams or removing the fixture from the machine.

► Until about four weeks ago gray market complaints to Congressional investigators had been diminishing. But now they are popping up more frequently. Reason: Some who are engaged in legitimate conversion deals find that they no longer need the steel. Instead of curtailing conversion arrangement, they are unloading the steel on the gray market.

► Ford engineers Stevens and Vennerholm showed at a recent SAE meeting in Detroit that savings of 30 pct in steel costs, capital investment in 20 machines, labor savings of 65 pct and an 80 pct reduction in floor space has been realized through the application of hot extrusion methods for the production of wheel spindles. Die savings are estimated to be 40 pct and the extruded parts also showed better fatigue life.

► Steel executives in Chicago all expect first quarter business to continue good. Some believe second quarter will show a slight decline. Significantly, very few will comment at all on the third quarter.

► Decline of appliance production has caused parts manufacturers to scout around for business. Automotive parts makers report that these companies are invading the automotive parts industry.

► Work in the coating of molybdenum and tungsten parts with silicon, aluminum, chromium and other metals has considerable promise for parts exposed to high temperature stresses. Reduction of the halides of the metal forms the coatings. Parts so treated are considerably stronger at temperatures over 2200° F than those made from the high temperature alloys. The extremely thin coatings protect the molybdenum and tungsten from oxidation.

► Here's the latest gimmick to get steel. A stamper, thinking of locating in Indianapolis, has put the bee on his anxious real estate agent to assure him of a mill quota for steel. Some lawyers have been known to do pretty well on the fringe of the steel industry. But no one seems to know what is par for a real estate agent.

► An Eastern plastic producer is reported to have applied for patent rights to a process for mixing resins in the phenol formaldehyde group while the batch is in the pulp state. Impregnation is conventionally done separately. If this process proves satisfactory it could mean plenty to the plastic industry with substantial savings both in time and money. Only hitch: Those companies who do not work in the pulp state would have to either install new equipment or farm work out.

► Algoma Steel Corp. Ltd. of Canada is developing its large reserves of iron siderite in an area north of Lake Superior to a point where production of a million tons of ore a year is anticipated when the program is completed. Since this ore contains 2 to 3 pct manganese, it makes a little better steel, lower in sulfur. However, it is not a solution to the manganese ore problem and will have little or no effect on the current shortage of ferromanganese.

► Some observers feel that the hullabaloo about abandoning the basing point system misses the point entirely. As they see it, increased freight rates mean more sales in the producers' back yard. It makes little or no difference what happens to f.o.b. with freight rates at their present level.

Several auto plant executives, accustomed to trading in their cars every year, have had the surprise of their lives recently when they tried to sell their present cars to used car dealers. For the first time since the war, many of these officials will find themselves actually paying out of pocket for their transportation unless used car prices rise sharply next spring.

Dry Lime Treatment of

Increasing government interest in water pollution abatement programs is of particular significance to plants unable to dispose of waste pickle liquor sludge by lagooning. A method of accomplishing disposal, without lagooning, is described by the author. The process employs dry lime procedures for production of quick settling sludges which dewater at practical rates on vacuum filters or centrifuges. Lime slacking or lime slurrying equipment is not required.

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SLUDGES resulting from application of lime slurries to spent pickling liquors are usually dewatered by lagooning. When lagooning is not possible, sludge disposal becomes a major problem. Many concerns who are or will be required to treat spent pickling liquors so as to yield waste effluents compatible with local, state or federal water pollution regulations must find means to mechanically dewater the lime-waste pickle liquor sludge before an adequate disposal process can be operated. This is particularly true of the relatively small pickling operations which are often found in crowded industrial areas and even in residential localities.

A pickle liquor disposal operation based on lime treatment, but without lagoon or impounding basin, must be capable of; (1) concentrating sludge solids to obtain a cake suitable for permanent dump, and (2) discharging liquid effluent acceptable to such public waters as it may eventually enter. It is also desirable that the plant be capable of operation by nonspecialized personnel.

The work reported in this article was instituted by the Warner Co., Philadelphia, and resulted in a waste pickle liquor disposal installation at the research laboratories of the company at Devault, Pa. The Columbia Steel & Shafting Co., Carnegie, Pa. and the Tolhurst Centrifugals Division of the American Machine & Metals, Inc. of East Moline, Ill., cooperated in this effort, and the Niagara Filter Corp. and the Whiting Corp. supplied pilot scale polishing filters. Most of the analytical work pertaining to analyses of effluents from the operation was performed by the Pennsylvania Department of Health. The waste pickle liquors used were obtained from mills in the Philadelphia and Pittsburgh areas.

The initial dewatering studies were made on sludges resulting from batch treatment of conventional sulfuric acid spent pickle liquor with slurries of both slaked quicklime and hydrated lime. Results on both rotary vacuum filter and batch centrifuge were not encouraging with respect to sludge dewatering rate. Modifications were therefore made in the piloting assembly in order to add the liming material in dry form to pickle liquor, thus yielding a granular, more readily dewaterable sludge.

The best lime efficiency is realized when hydrated lime or slaked quicklime is applied in slurry form to waste pickle liquor, but the resulting sludges are slimy. However, when properly sized liming materials are added in the dry form to waste pickle, without first being slurried in water, the sludge builds up on the lime particles to result in a granular sludge with good settleability and dewatering characteristics. Since that part of the lime particle serving as a core on which the sludge can build, does not react, consumption of more lime than the acid-alkali relationship of the system calls for, results. On the other hand, a sludge is produced which can be mechanically dewatered at practical rates, and effluent volume is minimized.

The piloting equipment used to operate on dry lime is shown schematically in fig. 1. The dry lime feeder was a rectangular box 10 x 20 x 4 in. with a section of No. 16 standard sieve cloth attached to the bottom. Lime was fed with a hand

Waste Pickle Liquor

By C. J. LEWIS
Technical Director,
Warner Co.,
Devault, Pa.

scoop into the open top of this device, which was vibrated by an attached ¼-hp motor having an off-center weight on the end of the shaft. By varying the number of 1-in. steel balls placed on the screen it was possible to vary the rate of dry lime feed.

The agitator in the neutralizing tank for the dry lime procedure was of the sweep type with speeds of 6 and 28 rpm. It was found desirable to agitate just sufficiently to hold the sludge in suspension during lime addition but to avoid shear action or violent agitation which tended to homogenize and break down the granular sludge. When a neutralized system had been held quiescent for settling, it was sometimes necessary to start up on the low speed of the agitator to free the blade from the mass of heavy, granular sludge.

A positive displacement pump was found preferable to the centrifugal type for handling the granular sludge. The centrifugal pump tended to homogenize the sludge and broke down the granular particles which, in turn, adversely affected the dewatering rate.

When operating the centrifuge, the basket was brought up to the low speed of 600 rpm. The sludge was then introduced quite rapidly, usually during a 1 to 2-min period, until the basket was full. Low speed was continued until the so-called "water wall" was no longer noticeable to the eye, and then the high speed of 1200 rpm was applied until the effluent discharge had practically ceased. The unit was then braked to almost stopping and the mechanical plow driven down the side of the basket. This caused the sludge cake to drop out through the open bottom of the centrifuge. About ¼-in. layer of cake remained on the centrifuge basket after each plow-out.

As the investigation progressed it was found possible to adjust the feed to the centrifuge so that the feed volume was almost equal to the volume of effluent being discharged. This practice resulted in larger yields of sludge per centrifuging cycle. On many occasions the sludge dewatered so well at the low speed that it was found unnecessary to use the high speed. Because of the impervious space around the sealing rings in the basket, the effective dewatering area of the centrifuge was approximately 7½ sq ft, and this figure has been used in the calculations.

In the polish filter operation a variety of precoating materials were all found to perform satisfactorily. The polish filters operated at approximately 30 gal per sq ft of filter surface per hr. When the centrifuge or vacuum filter was operating properly the effluents contained such a small amount of solids in suspension that practically no cake developed in the polish filters during the processing of several hundred gallons of pickle liquor. However, when starting on clean filter cloth or screen, the primary dewatering units passed a considerable amount of suspended solids until sufficient cake accumulated to act as a good filter medium; and on such occasions or at times when leakage or spillage from the primary dewatering unit occurred, the buildup of cake in the polish filters was quite rapid.

In the initial runs using the dry lime addition

FIG. 1—Schematic sketch of pilot equipment used on dry lime treatment of waste pickle liquor.

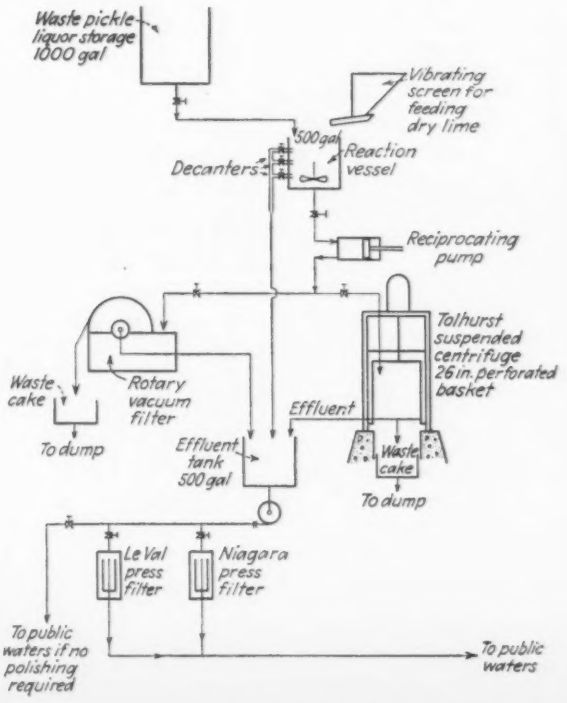


TABLE I

WASTE PICKLE LIQUOR ANALYSES

	1	2	3	4	5	6
Acid value, G equiv. SO_4 ion per l	55.2	63.3	128.8	128.6	41.7	48.0
SO_4 equiv. per gal, Lb	0.46	0.53	1.07	1.07	0.35	0.40
Fe per gal, Lb	0.18	9.18	0.56	0.56	0.11	0.13
Color (parts per million)	60.0				100.0	
Odor	Musty				Greasy	
Turbidity (parts per million)	100.0				1200.0	
Suspended solids (parts per million)					3680.0	
Volatile suspended solids (parts per million)					2740.0	
Fixed suspended solids (parts per million)					940.0	
Settleable solids (1 hr), (ml per l)	0.05				20.0	
Grease, ether-soluble (parts per million)					2309.0	
pH	0.8	0.8			1.2	
Acidity to pH 4 (parts per million)	24,400				38,000	
Acidity to pH 8 (parts per million)	85,000					
Specific gravity	1.06	1.07				

procedure, lime requirement was, in some instances, in excess of four times the calculated dosage. As the developmental work proceeded, lime efficiency was considerably improved through control of lime addition rate and mixing speed, and particularly through use of liming materials of optimum particle size. The most complete effluent analyses were made on the earlier runs before improved lime efficiencies had been realized. Therefore, since the following runs, summarized in tables I to IV, have been selected primarily to emphasize effluent characteristics, they will reflect some of the lowest lime efficiencies.

The six runs tabulated in the tables have been selected to emphasize dewatering rates and effluent analyses of three different pickle liquors and are numbered consecutively for convenience only. It is recognized that the data as tabulated is not complete. Since the analytical work pertaining to each run was considerable, effort was made to hold this to a minimum. Hence, in grouping six isolated runs in order to emphasize effluent characteristics in terms of the more common water pollution factors, a lack of uniformity in the supplementary data cannot be avoided.

TABLE II

PROCESSING DATA

	1	2	3	4	5	6
Waste pickle liquor, Gal	104.0	97.5	104.0	39.5	62.0	92.0
Acid value, G equiv. SO_4 ion per l	55.2	63.3	128.8	128.6	41.76	48.0
SO_4 equiv. per gal, Lb	0.46	.053	1.07	1.07	0.35	0.40
Fe per gal, Lb	0.18	0.18	0.56	0.56	0.11	0.13
High calcium quicklime (calculated), Lb	27.8					
High calcium quicklime used, Lb	92.5					
Dolomitic quicklime (calculated), Lb		25.6	55.5			
Dolomitic quicklime used, Lb		100.0	191.0			
Dolomitic hydrate (calculated), Lb				24.9	14.4	24.8
Dolomitic hydrate used, Lb				76.0	28.0	58.0
pH attained	10.2	8.9	9.8	9.0	9.5	9.0
System after liming, Gal	110.0	101.0	112.0	41.5	65.0	93.5
Wet sludge recovered (centrifuge), Lb	272.0	270.0	339.0[1]	239.0	(2)	109.0[1]
Mechanical H_2O in sludge, Av. pct	37.6	40.75	45.4	42.6	(2)	36.87
Dry solids, Lb per sq ft per hr	28.8	37.20	22.6	73.5	(2)	21.2
Pickle liquor processed, Gal per sq ft per hr	16.4	22.80	6.4	21.0	(2)	16.0

[1] Partial recovery. Remainder processed on rotary vacuum filter.
[2] See table IV.

While the dewatering data in table II were obtained when using the centrifuge, it is reasonable to anticipate that a continuous rotary vacuum filter of proper design would yield comparable data. When operating the continuous rotary vacuum filter available during the studies being reported, great difficulty was experienced in maintaining the heavy granular sludge in suspension in the filter bowl. The dewatering rate data obtained under this condition was therefore deemed unreliable. On the other hand, it was not believed that the quality of rotary vacuum filter effluent was materially affected by the inability of the filter to pick up a good cake. The rotary vacuum filter was operated primarily, therefore, for the benefit of its effluent analysis.

In table I, waste pickle liquors 1, 2, 3 and 4 are the conventional or sulfuric acid type. Liquors 1 and 2, both from the same mill, may be classed as dilute because of their relatively low acid value, while liquors 3 and 4, from another mill, are of about average concentration. Liquors 5 and 6 from still a third mill reflect a somewhat unique condition wherein the waste contains substantial amounts of grease.

The processing data in table II particularly emphasize the small volume increase in the waste pickle liquor-lime system using the dry lime addition procedure. With reference to the figures for the calculated quantity of liming material in each run, correction has been made to allow for the inert substances in the liming materials used.

It is hoped that the effluent analyses reported in table III will be of some value to those who must appraise pickle liquor disposal processes in terms of stream pollution abatement requirements. In particular, the appraisal of the pollutive nature of waste pickle liquor in terms of biochemical oxygen demand (or of the effluents from lime treatment of waste pickle liquor) has been the subject of some controversy. It has been suggested that the oxygen demand of such effluents be viewed as immediate rather than biochemical except in the case of pickle liquors which may carry appreciable amounts of soluble organic materials.

Referring further to table III, the figures for total solids are of special interest. These reflect the tendency of calcium sulfate to form supersaturated solutions. Not reflected in the data is the fact that almost all of the dissolved solids content of the effluents reported consisted of soluble calcium sulfate, even in runs Nos. 2, 3, 4, 5 and 6 where dolomitic liming materials had been used. During the many runs made on various

pickle liquors the polish filter effluents were generally sparkling clear at the time of discharge from the filter; but in a matter of hours, usually during overnight standing, these effluents became somewhat cloudy and deposited a thin but hard film of gypsum on the walls of the containing vessel. The possibility of *gypsum scaling* should therefore be borne in mind when designing a pickle liquor disposal operation based on lime treatment.

Table IV reflects a typical set of data from a number of laboratory filter leaf tests made on run No. 5. Such data further bear out the impression that a continuous rotary vacuum filter designed to handle a heavy granular sludge should prove successful as a dewatering unit in the dry lime addition method.

In order to more fully interpret the data in the four tables, several facts pertaining to the six separate runs may be noted. In run No. 1 a sample of the system withdrawn immediately after the dry lime addition settled to 61 pct sludge volume in 35 min and to 53 pct sludge volume in 6 hr. Analysis of the decanted supernatant liquor from the sample removed for settling rate determination is found in table III.

In run 2, the system after dry lime addition was allowed to remain quiescent for 24 hr, at which time approximately 48 gal of the system constituted sludge for dewatering, with the remainder of the system being a clear supernatant liquid which was decanted. The sludge was centrifuged, after which the centrifuge effluent was allowed to stand about 20 min before being decanted to the polish filter. The discrepancy in the total solids content of the centrifuge effluent before and after decanting cannot be explained although it is possible that the sample of centrifuge effluent taken for analysis was not representative of the total effluent. The centrifuge effluents throughout all runs were characterized by the rapidity with which the suspended solids therein settled.

With reference to run 3, it is significant to note that as the spent pickle liquor becomes increasingly higher in acid value, thus requiring increased dosage of dry lime, sludge volume increases, so that when an acid value of about 130 is reached almost no sludge settling can be realized after the lime addition. In run 3 the system was allowed to stand 18 hr after lime addition and the sludge volume was still 94 pct of the original system volume, thus making it impractical to decant supernatant liquid from the system. Also in connection with run 3, it can be pointed out that such filter cake as was obtained from the rotary vacuum filter was 3/8 in. thick and contained an average of 50.83 pct mechanical water.

In run 4 the centrifuge effluent initially contained 300 ppm iron because some of the discharge spilled over the rim of the basket during charging. This possibility is a factor which must be considered in any design involving a

TABLE III

EFFLUENT ANALYSES. PARTS PER MILLION UNLESS OTHERWISE INDICATED

	Color	Turbidity	Total Solids	Total Volatile Solids	Total Fixed Solids	Suspended Solids	Volatile Suspended Solids	Fixed Suspended Solids	Oxygen Consumed	Iron	B.O.D. (5 day)	pH	Settleable Solids (1 hr), ml per l	Odor	Ether-soluble Grease
Run No. 1															
Decanted supernatant liquor from sample removed for settling rate determination	60	60	4140	660	3480	50	20	...	70	1.6	68	...	0.05	Chemical	...
Centrifuge effluent	10	200	4300	740	3500	190	70	120	67	8.0	68	...	1.4	Chemical	...
Polish filter effluent	10	70	3720	580	3140	20	10	10	52	0.8	53	...	0.02	Chemical	...
Run No. 2															
Decanted supernatant liquor from 24 hr settling	100	160	14900[1]	4040	10860	240	140	100	174	12.0	220	6.9	1.5	Chemical	...
Centrifuge effluent	75	800	5140	1400	3740	860	220	640	112	68.0	114	11.7	14.0	Chemical	...
Centrifuge effluent after 20 min settling	40	300	7200	1980	5220	600	200	400	112	6.0	145	8.1	5.0	Chemical	...
Polish filter effluent	60	10	6760	2040	4720	35	35	0	100	3.0	124	7.3	0.05	Chemical	...
Run No. 3															
Rotary vacuum filter effluent	30	50	3840	460	3380	120	40	80	26	0.4	54	..	0.05	Aromatic	...
Centrifuge effluent	...	...	4520	...	...	...	...	...	...	2.0	...	...	...	...	...
Run No. 4															
Decanted centrifuge effluent from 6 hr settling	...	...	3900	..	...	...	...	...	..	0.3	...	...	...	...	...
Run No. 5															
Effluent from laboratory filter leaf	...	...	3560	...	...	...	...	...	45	5.0	150	...	...	...	...
Run No. 6															
Rotary vacuum filter effluent	10	220	4040	740	3300	200	60	140	...	5.0	117	...	0.4	Chemical	1.4
Centrifuge effluent	0	300	3273	790	2480	310	200	100	...	3.0	99	...	...	Chemical	5.0
Polish filter effluent	0	10	3650	360	3290	15	...	0	...	0.2	76	...	0	Chemical	...

[1] Supernatant liquor fouled in effort to decant a maximum.

centrifuge for this purpose. The iron in this centrifuge effluent was almost entirely in the form of a suspended iron hydrate which, after 6 hr quiescent standing, had settled to less than 2 pct of the total centrifuge effluent volume.

Referring to run 5, the grease in the waste pickle liquor was introduced from drawing and press room operations. Most of the grease was in a layer on the surface of the pickle liquor and much of it could have been removed by skimming. This waste was of particular interest because of the possible effect of the grease on effluent quality and on sludge dewatering characteristics. In the course of the studies on this waste it was established that the grease remains in the sludge and is practically absent in the effluent; also, that this grease in the amount occurring had no detectable effect on sludge dewatering. No attempt was made to establish whether there had been any chemical reaction involving the grease during and after the lime addition.

TABLE IV

LABORATORY FILTER LEAF DATA

Solids in Slurry	
Wet wt 250 cc, G	263.6
Dry wt, G	26.8
Pct	10.3
Submergence, Pct	37.5
Filtration	22
Vacuum	
Final Dewatering, In.	22
Rpm	¼
Time, sec.	
Filtering	88
Dewatering	96
Compression	None
Discharge from cloth	ok
Cake thickness, In.	3/8
Clarity of filtrate	Clear
Filtrate, cc	555
Wet wt of cake, G	180.4
Dry wt of cake, G	61.9
H_2O removed, G	118.5
H_2O in cake, Pct	65.61
Dry wt, Lb per sq ft	0.820
Lb per sq ft per hr	12.3
Processing rate—Gal. per sq ft per hr	13.7

In run 6 on this same grease-bearing waste, a sample of the system withdrawn immediately after lime addition settled to 60 pct sludge volume in 52 min and, at the end of 24 hr settling, 50.2 pct of the sample volume constituted sludge, the remainder being a clear supernatant liquid. This further emphasizes the substantial sludge settling which may be realized when dry liming the relatively dilute waste pickle liquors.

Several hundred gallons of waste pickle liquor from stainless operations were processed in the pilot plant. This waste, in addition to iron, nickel and chromium, contained hydrofluoric, nitric and hydrochloric acid. The acid value was 65.76. Systems of the stainless waste treated with lime slurries resulted in anticipated gelatinous, slow-settling sludges which dewatered at impractical rates on both vacuum filter and centrifuge. Dry lime addition to the stainless waste resulted in quick-settling, heavy granular sludges which dewatered on the centrifuge at rates in the range of those obtained when working with the conventional sulfuric acid type of pickle liquor.

Because of the practical absence of sulfates in this waste and the high solubility of the calcium salts of nitric and hydrochloric acid, the stainless liquor, as expected, required less dry lime per unit of acid value as compared with the conventional sulfuric acid waste. The amount of dry lime required was approximately 150 pct of that demanded by the acid-alkali requirement. The most rapid dewatering rates were obtained on sludges resulting from treatment with dolomitic hydrated lime. The centrifuge cakes averaged 51.6 pct mechanical water. The polish filter effluents and decanted supernatant liquors from the dry lime-stainless steel pickle liquor combination were characterized by their relatively high calcium nitrate content.

No attempt was made, during the work being described, to achieve any particular pH value in final effluent. It is quite likely that as pollution abatement programs develop, one requirement of industrial effluents entering public waters will be that effluent pH be within the range of 5.5 to 8.5. With reference to pickle liquor disposal, complete precipitation of ferrous iron requires a pH value in excess of 8.5. This is true of either the lime slurry method or the dry lime procedure. When designing the disposal plant, therefore, provision should be made for possible adjustment of effluent pH after sludge dewatering. Aeration should be adequate in most cases.

Experience with the dry lime procedure thus far suggests a nucleus around which a pickle liquor disposal operation based on the procedure may be designed. First requirement is adequate storage for the waste so that inequalities in daily or hourly composition may be smoothed out and allowance made for reasonable downtime of the disposal equipment. Next, batch neutralizing tanks of simple construction are recommended. Three tanks are desirable so that lime addition, sludge settling and sludge dewatering may be carried out simultaneously. Particular care must be given to provision for moving the heavy granular sludge to the dewatering unit. A sand screw has been suggested. It has also been suggested that each of the three tanks discharge into a common trough holding a screw conveyer feeding the mechanical dewatering unit. The pumping of heavy sludge is entirely possible; but pumping can adversely affect the dewatering characteristics of the sludge. Finally, it is very desirable that provision be made for batching the effluent, both from decantation and mechanical dewatering, for inspection before discharge.

Many modifications of design are possible and it is beyond the present scope to detail an installation. It is generally recognized that while waste pickle liquors have many characteristics in common, there are, nevertheless, so many variables with reference to composition, concentration, volume, available space and final effluent requirements, that each installation must be tailormade.

The employment of the dry lime addition pro-

cedure for the disposal of spent pickle has three relative disadvantages. From the technological point of view, the control of pH during processing may be troublesome. While it is not difficult to control the addition of lime to produce a system with pH value within the desired range, the effluent from the mechanical dewatering of the resulting sludge is likely to have an excessively high pH. This is because excess lime in the sludge cake is disturbed during the dewatering and further reaction of the lime ensues to add alkalinity to a system already alkaline. This disadvantage can be overcome by retaining the combined effluents from decanting and dewatering for a final pH adjustment.

From an operating point of view, the addition of dry lime by the most simple procedure, through a vibrating screen, gives rise to dust which may be a nuisance. It is not unreasonable to presume that a method for adding the dry lime beneath the surface by means of air injection, or beneath the surface by means of gravity flow into a rapid mix chamber, will eliminate this factor. From the economic point of view, the excess lime required by the method introduces an added cost which will render the method impracticable when the quantity of pickle liquor to be handled is excessive. The use of dry lime will not be advantageous where treatment with lime slurry followed by lagooning can be employed.

On the other hand, the use of dry lime in treating waste pickle liquor has certain advantages. The most important of these is the fact that the resulting sludge can be mechanically dewatered at a reasonable rate. Where the amount of pickle liquor is sufficiently small and there is no available space for lagooning of sludge, the dry lime procedure affords a disposal method which is economically and technologically possible. Other concomitant advantages are that the use of dry lime favors minimum volumes throughout the disposal operation and maximum processing of the waste pickle liquor through the dewatering unit; and also eliminates the installation and operation of equipment necessary for slaking or slurrying lime.

To illustrate, consider a case where 3000 gal of waste pickle, including rinse waters, are produced during a 24-hr day. This waste, of the conventional sulfuric acid type, has an acid value of 75, so approximately 1/3 lb of high calcium quicklime is theoretically required to effectively treat each gallon of the waste. A practical lime slurry containing 15 wt pct solids will consist of approximately 2½ gal of water for each 1/3 lb lime; or, in other words, about 2600 gal of tramp water will be added to the 3000 gal of spent pickle in the course of treating same with the lime slurry. This procedure will usually result in the slow-settling, slimy sludge which, so far as is known, cannot be mechanically dewatered at a practical rate.

It has been found that such sludges may, under best settling conditions, settle to 60 pct of the original system volume. Even if this degree of settling were realized and it were judged expedient to mechanically dewater the sludge, at least 3400 gal of the system would remain for mechanical dewatering after decantation.

On the other hand, if the method of dry lime addition is applied to the original 3000 gal of waste pickle liquor under consideration, approximately 1 lb of high calcium quicklime will be required for each gallon of waste treated. After treatment, the system volume will still be practically 3000 gal. Based on the data so far obtained, it is reasonable to expect that overnight settling of the system will make possible the decantation of at least 30 pct of the system for discharge without further treatment. This would leave about 2100 gal of system to be mechanically dewatered, a decrease of over 38 pct as compared with the lime slurry method. Furthermore, the dewatering rate of the 2100 gal will be such that this can be done economically with equipment proportional in size to the other units of the waste disposal installation.

To put it another way, the use of dry lime makes possible the installation and operation of a disposal plant of minimum size and without lagoons, but will substantially increase lime consumption. As the volume and concentration of pickle liquor to be treated increase, the cost for lime finally outweighs other advantages of the dry lime procedure, and such procedure is then no longer practical.

The author acknowledges the generous cooperation and guidance of the following: T. M. Broughton, Tolhurst Centrifugals Div., American Machine & Metals Co.; L. C. Books of The Niagara Filter Corp.; and G. A. Elias of the Pennsylvania Department of Health.

Metal Powder Standards

ADDITIONAL standards, establishing methods for determining hydrogen loss in metal powders and for determining insolubles in iron and copper powders, have been adopted by the Metal Powder Assn., New York.

The two standards, prepared by the Association's Granular Powders Standards Committee, have been added to the previously released standards which were titled as follows: "Method for Sampling Finished Lots of Metal Powders"; "Method for Determination of Flow Rate of Metal Powders"; "Method for Determination of Apparent Density of Metal Powders"; and "Tentative Method for Sieve Analysis of Granular Metal Powders."

Copies of the reports are available at 25¢ each from the Association's office, 420 Lexington Ave., New York 17.

Materials Handling

Third annual exposition and conference at Philadelphia attracts record breaking attendance . . . Cost reduction potentialities stressed in exhibits and at technical sessions.

FOCUSING on what has been described as one of the most fertile fields for industrial cost reduction, the third annual Materials Handling Exposition and Conference, held last week in Philadelphia, attracted a record breaking attendance of 18,000 engineers and executives to the largest exhibit of materials handling equipment and supplies ever assembled under one roof.

The exposition, under the joint sponsorship of the Materials Handling Division of the American Society of Mechanical Engineers, and the Material Handling Institute, provided five days packed with new ideas on modern methods of moving, storing and handling material of every description. The concurrent technical sessions and film lectures provided a powerful practical supplement for the exhibits of some 240 companies participating in the exposition.

Highlighting the conference was the annual banquet of the Material Handling Institute, held Wednesday evening at the Bellevue-Stratford Hotel. Matthew Woll, vice-president, American Federation of Labor, the principal speaker at the banquet, advanced a plea for greater cooperation between labor and management "in the interests of social advancement and better standards of life in a larger freedom." In the course of his talk, Mr. Woll stressed that the AFL has been unalterably opposed to Communism and intended to continue to oppose it.

The equipment exhibits were marked by the introduction of many new and unusual developments in materials handling, all centering on reducing the cost of industrial handling of supplies and products, and at the same time requiring the minimum of effort on the part of the worker.

Keynote for the technical meetings at the conference was delivered by Curtis M. Barker, Jr., sales manager, Pallet Loader Div., Lamson Corp., Syracuse, N. Y., and general chairman of the conference, who pointed out that modern materials handling methods present management with many opportunities for cost reductions. Mr. Barker outlined how various departments in a plant, such as purchasing, sales, engineering and shipping, can be coordinated to supply data for studies of materials handling costs.

Mr. Barker stressed the importance of giving materials handling full consideration along with floor layouts, processing, storage, plant improvement and new construction. Materials handling, he said, warrants the recognition of top management to the point where definite authority and responsibility is placed at a high enough level on

Exposition

Shown at the MHI banquet, from left to right, are Harry Keller, engineering manager, Lamson Corp., Syracuse, N. Y. and chairman of the ASME Materials Handling Div.; Samuel W. Gibb (seated), president of MHI and general sales manager, Yale & Towne Mfg. Co., Philadelphia; Bernard Samuel, mayor of Philadelphia; Matthew Woll, vice-president of the American Federation of Labor; and H. A. Carter (seated), vice-president of MHI and president, Geneva Metal Wheel Co., Geneva, Ohio.

a full time basis so that support of heads of other departments is insured. The best talent obtainable, on a scale commensurate with the size or type of operations, properly employed, Mr. Barker emphasized, can return dividends rarely found elsewhere.

Automatic Pallet Loading

The substantial savings which can be realized through the use of an automatic pallet loading device was discussed in a paper by F. N. Landon, engineering division, manufacturing department, Sun Oil Co., Philadelphia. This comparatively new device, which receives cartons at the end of one or a number of conveyor lines and automatically piles them in any predetermined pattern upon pallets, is being manufactured by the Lamson Corp.

The paper described cost studies which had been made comparing the use of manual labor and fork trucks with the automatic pallet loader and fork trucks for handling 1- and 5-qt cans of lubricating oil in cartons. These computations suggested that the use of the automatic loader for this application would result in savings of $17,445 per year.

This unit, according to the author, can be adapted for handling packages other than cartons, including bags, and it appears that it could also be adapted for use with glued loads although no machine for such use has yet been produced.

Handling As a Cost Element

Citing a number of typical cases, Stevens H. Hammond, president, Whiting Corp., Harvey, Ill., demonstrated, in a paper entitled "Materials Handling As An Element of Cost," various means by which the use of modern materials handling techniques can not only reduce operating costs, but also lower accident rates and boost worker morale.

Management is entering a new year with new problems and possibly a reduced volume of business, Mr. Hammond said. In order to continue profitable operations with a reduced volume, it will be necessary to re-evaluate every phase of production procedure. Most manufacturers, he pointed out, have squeezed out the waste and have attained high efficiency in their direct labor operations. For them the greatest opportunities for future economies lie in the reappraisal and

mechanization of shop activity concerned with movement of material. These opportunities, Mr. Hammond emphasized, are not confined to big plants, mass production plants or heavy industries. They are almost everywhere—wherever people work and there are things to be moved.

Mr. Hammond's paper stressed that efficient handling methods give many benefits in addition to reduced production costs, benefits which at times are more important than reduced costs. As an example he cited the steady flow of production made possible through the application of time and motion studies to provide an even flow of parts and materials through the plant. There is also the utilization of existing production space to better advantage as the result of shortened production cycles, reduction of inventory of goods in process, and the change from stop-and-go to continuous flow production. All of this, Mr. Hammond said, is in addition to better working conditions, greater safety and other factors which improve employee relations and attract a better class of labor.

Cost Control

An engineering approach to the analysis and control of materials handling installations, a vexing problem in many plants, was offered in "Materials Handling Cost Control" by E. F. Gibian, chief industrial engineer, Thompson Products, Inc., Cleveland.

Cost analysis cannot be determined by a rigid accounting. It requires an engineering approach. This premise was emphasized by the author in reviewing the essential basic data required, which are as follows: (1) Cost of installation; (2) effect on floor space, including the possible reduction of productive equipment; (3) operating cost of handling equipment, including maintenance and depreciation; (4) effect on quality of product and scrap; (5) effect on work-in-process inventory and on storage; (6) direct labor savings; and (7) indirect labor savings and reduction of manufacturing expense, including trucking and supplies.

Every cost category incurred by a department or section of a plant must be scrutinized. Both an engineering analysis and historical accounting data may be employed. Standards for each expense should be established, and, wherever possible, the standards should be set up in two classes, a fixed account unaffected by production and a unit variable account which fluctuates directly with volume of activity. Having established these standards, the data can be recorded on a budget standard rate sheet and overall costs or unit costs can be readily analyzed. Furthermore, the share of any particular operation in total cost can be appraised and the effect of proposed changes or new installations on total costs at any level of activity can be determined.

Once such standards are established, and the data can be checked with periodic performance reports, budgetary control becomes comparatively easy.

Taking as an example a conveyorized valve line, the author demonstrated the system. Among the basic data established in this example were a $1400 reduction of work-in-process inventory due to the reduced number of valves lying in pans at each operator's station, and direct labor cost reduction of $2.70 per 1000 valves. It was finally predicted that, at current levels of production, a saving of $16,800 per year was to be realized on an investment of $12,700 in the handling equipment. Results, once the line was put in, met the predetermined cost figures and the periodic performance charts, as well as providing a constant means of control, will indicate such improvements and refinements as may become necessary.

Bulk Handling

Care in the selection and design of equipment for handling bulk materials was advised by L. O. Millard, assistant sales manager, Link-Belt Co., Chicago, in the paper "Developments in Bulk Handling."

It was pointed out that designs of the various bulk handling machines have advanced with recent requirements for greatly increased capacities, longer hauls, more dependability and process changes.

The magnitude of many belt conveyer applications and the problems solved in extending systems over rugged terrain and in meeting the problems of outdoor exposure have been exceptionally noteworthy in recent years. Huge belt systems now convey coal from underground at 3000 tons per hr, and, in dam projects, similar conveyers have given remarkable service in moving gravel and impervious core material. Most of the installations were made possible by rather recent advances in the design of conveyer belts, according to the author. Currently, textile cord belts are being made substantially stronger than ever before, and steel wire cord belt, from 4 to 10 times as strong as the textile belts depending on width and troughing characteristics, is available.

Bulk handling belt conveyers involve a number of factors which are relatively unimportant in the design of shorter systems. Among those which must be considered are: (1) Accelerating stresses are magnified in such large units; (2) the conventional T_1 to T_2 ratio of drive pulley must be kept within recommended limits to avoid slippage, especially in outdoor atmospheres where moisture is likely; (3) due to length, slack take-up must be carefully provided for; (4) stretch and shrinkage must be allowed for; and (5) a low friction factor in carrying idlers is most important for obtaining maximum centers on relatively horizontal conveyers where friction forces predominate.

Conklin Elected MHI President

At the annual business meeting of the Material Handling Institute, held Jan. 14, J. W. Conklin, general sales manager, Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich., was elected president for the coming year. J. G. Bucuss, manager, Strapping Div., Acme Steel Co., Chicago, was named first vice-president, and J. P. Lawrence, president, American Monorail Co., Cleveland was elected second vice-president.

Oscillating conveyers are reported to be finding the greatest field of usefulness where it is necessary to keep the material away from all moving parts. The systems have been ideal for handling hot foundry sand and castings and other hot or abrasive materials.

Rotary car dumpers, grain car unloaders and other handling machines for free flowing bulk materials have been developed similarly and have proved of inestimable value. The further improvement of such equipment is being pushed and will, in the author's opinion, contribute substantially to national production.

Load Lifting Developments

Misapplication of the various types of cranes and hoists now available was warned against by A. R. Walkley, general sales manager, Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich., in the paper "Developments in Crane, Hoist and Elevator Design and Application."

It was emphasized that with the range of equipment now available it is possible and necessary to install the equipment exactly suited to efficient and economical operation.

The superiority of modern equipment in control, speed, weight saving, maintenance required and other considerations has been an outstanding achievement. Advanced welding procedures permit complete fabrication of 100-ft girders that are perfectly true and cambered to offset deflection. Improved lubricants and oiltight gear cases are far superior to the exposed, high speed gearing formerly used. Heat treated gearing and machine-cut gear teeth provide units of long life and have substantially reduced operating noise. Ball and roller bearings insure long shaft life, mechanical alignment and generally decreased maintenance costs. Ground, hardened and toughened wheels give longer life to these parts and provide accurate crane alignment resulting in true traverse of the bridge and trolley.

Among other developments, the author pointed out that ac control improvements in recent years have produced units that are comparable to dc systems and permit close load speed control as well as effective spotting of the loads. Reductions in motor frame sizes through adoption of improved insulating materials has been another factor. In both these developments, further improvements and benefits are anticipated.

Efficient Equipment Coordination

One of the essentials of efficient overall material handling in a manufacturing plant is necessarily coordination and cooperation among departments. In one of the conference papers, C. M. Harris, production manager, Electrolux Corp., Old Greenwich, Conn., described the setup instituted at Electrolux after the war for effecting this coordination.

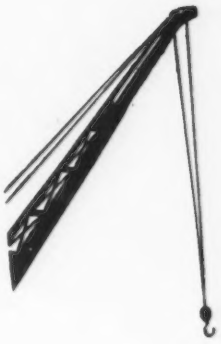
The problem in this instance was particularly difficult as production was at a rate approximately four times that of prewar levels, and as a result much receiving and warehousing space had to be reallocated to production purposes.

The solution finally adopted involved centralized control in which four men, on the foreman level, work with a general stores supervisor in scheduling and using the equipment. One man represents the receiving department and all of its phases; the second is responsible for all stores within the plant itself; the third handles all phases of outside warehousing; and the fourth is responsible for the actual handling equipment and personnel. With this system, 2500 tons of material per month are handled by the same number of men as were previously used in handling only 600 tons per month. This can be attributed to the handling machines adopted as well as to the control system, but it has also been in spite of the problem of having to use warehouses from 5 to 30 miles distant from the plant.

An empty pallet supply is maintained in each warehouse and incoming loads are immediately palletized for storage and subsequent handling. Sufficient portable roller skate conveyer is also kept on hand at each storage station to reach any point in the building. Using such conveyers, only two men are required for most operations. Prior to adoption of palletizing and conveyerizing, packing and shipping of accessory equipment for shipment to branch offices required 9000 sq ft of floor space and 33 men. Installation of caster equipped baskets, pitched roller skate conveyers, pallets for the finished packages and other equipment, made it possible to carry out these operations with only 14 men in an area of 1800 sq ft.

Careful selection of drivers of the powered units has resulted in 3½ years of operations free of accidents or injuries.

Curtis H. Barker, Jr., general chairman of the conference and sales manager, Pallet Loader Div., Lamson Corp., Syracuse, N. Y., delivering the keynote address.



Wheeled

By GEORGE KROGER
Chief Tool Designer,
Studebaker Corp.
South Bend, Ind.

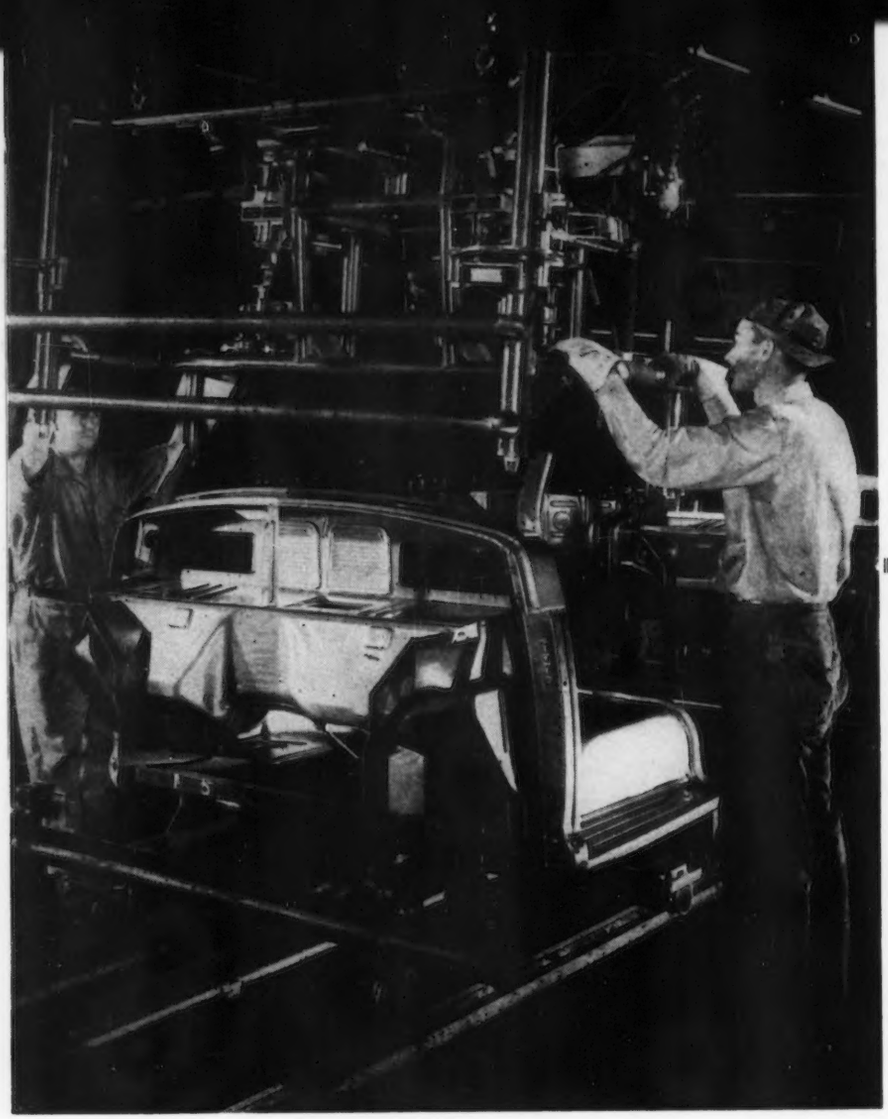


FIG. 1—The first counterbalanced fixture is lowered over a floor pan previously attached rigidly to a wheeled dolly. The instrument board and hinge pillar subassembly are part of the pan assembly.

TRUCK body or cab stampings are often assembled in box-like stationary fixtures in and around which several men perform the necessary spot welding and other fastening operations. Such fixtures are usually expensive and frequently slow down the assembly line, causing congestion and delays. If one operator is slow or encounters trouble in fitting parts into place, the whole crew or even the whole line may be delayed.

To avoid such delays and expedite production of truck cabs, a series of simpler fixtures utilizing a merry-go-round assembly method was set up in the Studebaker truck plant at South Bend, Ind. The wheeled dolly on which each truck cab is built forms a part of each of the supplemental fixtures, and sockets in the dolly locate the respective fixtures with reference to the dolly and to the cab assembly, the floor pan of which is fastened rigidly to the dolly.

The dolly and the fixtures are welded structures built up largely from steel tubes. The arrangement costs less than for large stationary box fixtures of which at least two would be required. All fixtures except the dollies are on balancers and suspended from tracks along which the supports move with the dollies and are shifted backward after lifting off an assembly completed therein.

Each fixture involves only a few operations, the use of two men at a time, and is occupied for an average of about 2 min per cab. In consequence, assembly operations move smoothly and without congestion. If a serious delay occurs, the assembly can be taken out quickly and set aside for repairs, thus insuring that neither the crew nor the line will be held up.

At the station shown in fig. 1, a framing fixture, supported by four cables, is being lowered over a floor pan, instrument board and hinge pillar subassembly, the pan first having been located and fastened to the dolly. The components are fed into the line from side areas where subassemblies are fabricated. The fixture locks the components in correct position for welding.

At the bottom of fixture uprights are tapered

Fixture Speeds Truck Cab Assembly

Wheeled dollies on a circular assembly line, which support and position components of truck cabs for welding, are being used to improve production rates at the Studebaker truck plant. These simple fixtures permit quick removal of an assembly from the line when extra adjustments are required, thus preventing a delay of the entire line.

pins that fit mating sockets in the dolly. Near the center of each side of the dolly is a socket for another fixture pin that is locked by a lever, when it enters the socket, as shown in fig. 2. The fixture and dolly form a box around the parts that are to be fastened together. These parts are locked by clamps pivoted to the fixture uprights. They swing into place and are locked by levers. There are several locating points that position the subassembly in correct relation to the pan and hold it rigidly for spot welding.

Gun welders, counterweighted and suspended from overhead tracks, are used to spot weld each of several specified points. These welds fasten the components permanently and insure that the assembly will fit other parts applied later. As these positioning and welding operations proceed, the dolly and fixture are moved along the track

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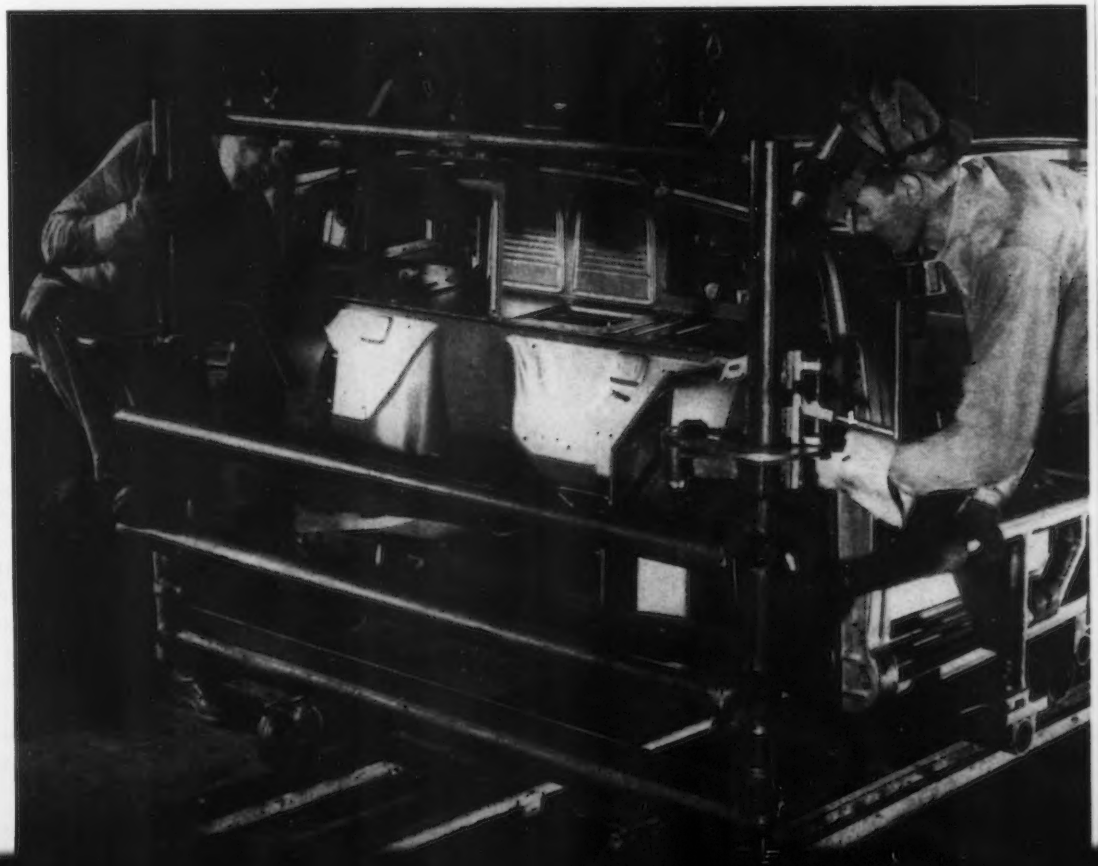

FIG. 2—The fixture in fig. 1 is shown here being locked to the dolly. These closing clamps hold the instrument board and hinge pillar subassembly in correct position for welding to the floor pan to form a major assembly.

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FIG. 3—One of the two door plug fixtures is being locked to the dolly and cab components. These frames size the door openings and position the roof and rear panels in relation to the instrument panel, hinge pillar and floor pan while welding.

by a floor chain that operates the entire merry-go-round assembly line. Supports for the fixture and welding guns move the same distance along their parallel overhead tracks.

When welding is completed, guns are released and elevated and the fixture is unlocked and pushed upward to clear the assembly. Then the fixture and guns are run backward to starting points where they are to be used on the next assembly on the next dolly. At the same time, the next crew takes the assembly on the dolly just released, sets other components, such as the roof, in place, lowers the next fixture, clamps the work and proceeds with welding the added parts.

For each cab, a set of three box-like fixtures is used in succession. When these fixtures have been used, the cab body shell is ready for the operation shown in fig. 3. This involves applying what are termed door plug fixtures, one at each side. After being locked to the central side sockets of the dolly and to the cab elements surrounding the door openings, these rigid frames hold the roof and back panel subassembly in correct relation to the floor pan and instrument board assembly while being welded in place. At the same time, the fixtures size the door openings so that both doors will fit as required when they are hung.

No large fixtures are needed for later operations as the shell of the cab is complete and only minor assembly operations, such as hanging the doors, are required. As the cab shell is relatively rigid, it acts as its own fixture during subsequent operations. After the latter are completed, the shell continues on the dolly until finished and ready for mounting on the truck chassis. The dolly remains on the *merry-go-round*, however, receiving a new floor pan, and continuing indefinitely through this assembly cycle.

This method of fixturing has proved excellent for the functions described and cab shells are assembled at the rate of 20 an hr, keeping pace with other assembly operations.

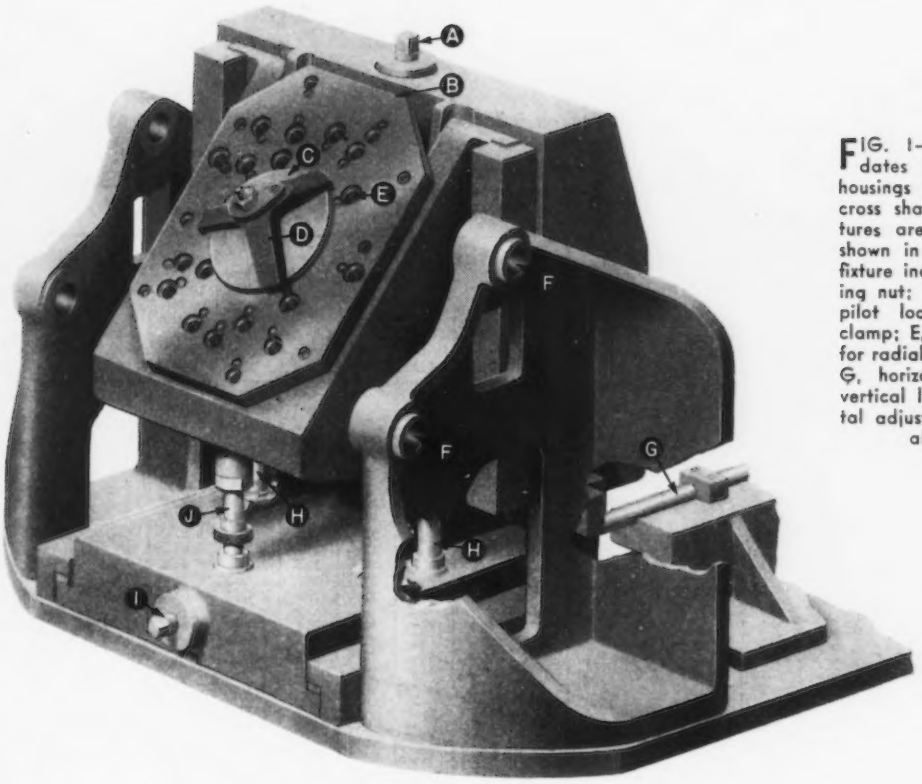

FIG. 1—This fixture accommodates 76 different sized bell-housings for drilling and boring cross shaft holes. Two such fixtures are used on the machine shown in fig. 2. Details of the fixture include: A, vertical adjusting nut; B, master rest plate; C, pilot locating ring; D, spider clamp; E, part locating pin holes for radial location; F, tool guides; G, horizontal locating pins; H, vertical locating pins; I, horizontal adjusting nut; and J, adjustable support jack.

Adjustable Fixture Increases Utility of Special Purpose Machine

Through the use of a two-station fixturing arrangement with adjustable hold-down clamps, locating devices and replaceable vertical and horizontal positioning pins, a special purpose machine has been utilized in drilling and boring 76 different sizes and shapes of bell housings. This description of the construction details of the fixture, typical tool sizes and spindle speeds for boring and drilling, and some of the parts machined show the versatility of this unit.

By THOMAS E. LLOYD
Machinery Editor
THE IRON AGE

o o o

VERSATILITY and flexibility in work holding will frequently mean the difference between maximum and intermittent operation of a machine tool. This, in turn, has a decided effect upon the profitable operation of such a machine. When a special-purpose machine, through the use of various fixtures with removable hold down clamps, locating devices and other fixture components, can be used in processing several parts, the machine will not only quickly pay for itself but many production problems will be solved that would otherwise require additional machine tool capacity.

An outstanding example of flexibility in fixture design is that developed for a machine that was designed especially for drilling and boring opposing holes in various sizes of bell housings. The machine, of special design, is a two fixture, two station unit, the first station being a loading and unloading station as well as an operating station, and the second being an operating station. The indexing is so arranged that, because the drilling consumes more time than boring, the inoperative time in the boring cycle is utilized in loading and unloading.

TABLE I

Typical Machining and Material Data on Bell Housing Drilling and Boring

Part No.	Material	Boring Heads					Drill Heads						Accessory Part Data			
			Right Hand		Left Hand		Right Hand Drill Head			Left Hand Drill Head						
		Finish Bore Diam., In.	Tool Bit Size, In.	Spindle Speed, Rpm	Tool Bit Size, In.	Spindle Speed, Rpm	Diam., In.	Length, In.	Spindle Speed, Rpm	Diam., In.	Length, In.	Spindle Speed, Rpm	Vertical Locating Pin, Length, In. ±0.0003 In.	Horizontal Locating Pin, Length, In. ±0.0003 In.	Part Locating Ring, Thickness, In.	Diameter, (+.000, −0.001) In.
90-518-9	Aluminum	1.375	3/8	1390	3/8	1390			853			853	5.3153	4.5869	7/8	18.310
11	Aluminum	1.375	3/8	1390	3/8	1390			853			853	5.3153	4.5869	7/8	18.310
102C-29	Cast Iron	1.250	5/16	1528	5/16	1528	17/32	13 1/8	250	17/32	13 1/8	250	3.1501	6.5753	7/16	3.148
102C-125	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.4818	6.9069	7/16	6.373
154	Cast Iron	1.000	1/4	1910	1/4	1910	31/32	11	316	31/32	11	316	3.5921	7.0173	5/16	5.123
183	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	2.9514	6.3766	7/16	5.1165
187	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	2.9514	6.3766	7/16	5.1165
191	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.2385	6.6837	5/16	5.248
208	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.4372	6.8624	5/16	6.060
213	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.2166	6.6418	5/16	6.060
223	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.4599	6.8850	7/16	7.123
225	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.4599	6.8850	7/16	7.123
227	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.4599	6.8850	7/	
229	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.5921			
230	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279				
234	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2				3/8	5.810
235	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279					5.2495	3/8	6.998
236	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279				3.5921	7.0173	7/16	6.373
247	Aluminum	1.375	3/8	1390	3/8	1390	11 1/32	14 3/8	227			250	4.2327	5.9792	7/16	7.623
252	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279		12 1/2	279	3.3934	6.8186	7/16	7.623
263	Cast Iron	1.125	5/16	1698	5/16	1698					12 1/2	279	3.1501	6.5753	7/16	6.248
282	Aluminum	1.375	3/8	1390			13/32	12 1/2	1048	13/32	12 1/2	1048	3.1501	6.5753	7/16	6.248
284	Cast Iron	1.125			3/8	1390	13/32	12 1/2	279	13/32	12 1/2	279	3.5492	6.9734	7/16	7.623
287	Cast Iron				5/16	1698	11 1/32	14 3/8	227	11 1/32	14 3/8	227	3.9455	4.6315	7/16	7.623
	Aluminum	1.125	5/16	1698	5/16	1698	13/32	12 1/2	1048	13/32	12 1/2	1043	3.4599	6.8850	7/16	7.123
456	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	4.2553	6.0838	7/16	6.248
457	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	1048	13/32	12 1/2	1043	4.2553	6.0096	7/16	6.248
458	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.1501	6.5753	7/16	6.248
460	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.7250	7.1502	7/16	7.623
461	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.1501	6.5753	7/16	6.248
462	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	4.1443	6.1553	5/16	6.060
468	Aluminum	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	4.7857	6.6198	5/16	5.373
472	Cast Iron	1.000	1/4	1910	1/4	1910	31/32	11	316	31/32	11	316	4.1889	6.0231	7/16	7.623
474	Cast Iron	1.000	1/4	1910	1/4	1910	31/32	11	316	31/32	11	316	4.2992	6.1334	7/16	6.373
476	Cast Iron	1.000	1/4	1910	1/4	1910	31/32	11	316	31/32	11	316	3.8572	5.1611	7/16	7.623
480	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.7250	7.1502	7/16	6.373
481	Cast Iron	.875	1/4	2183	1/4	2183	27/32	10 3/4	362	27/32	10 3/4	352	3.1501	6.5353	7/16	6.248
483	Cast Iron	1.125	5/16	1698	5/16	1698	13/32	12 1/2	279	13/32	12 1/2	279	3.3715	5.2057	5/16	5.373
													4.2553	6.0896	7/16	6.248

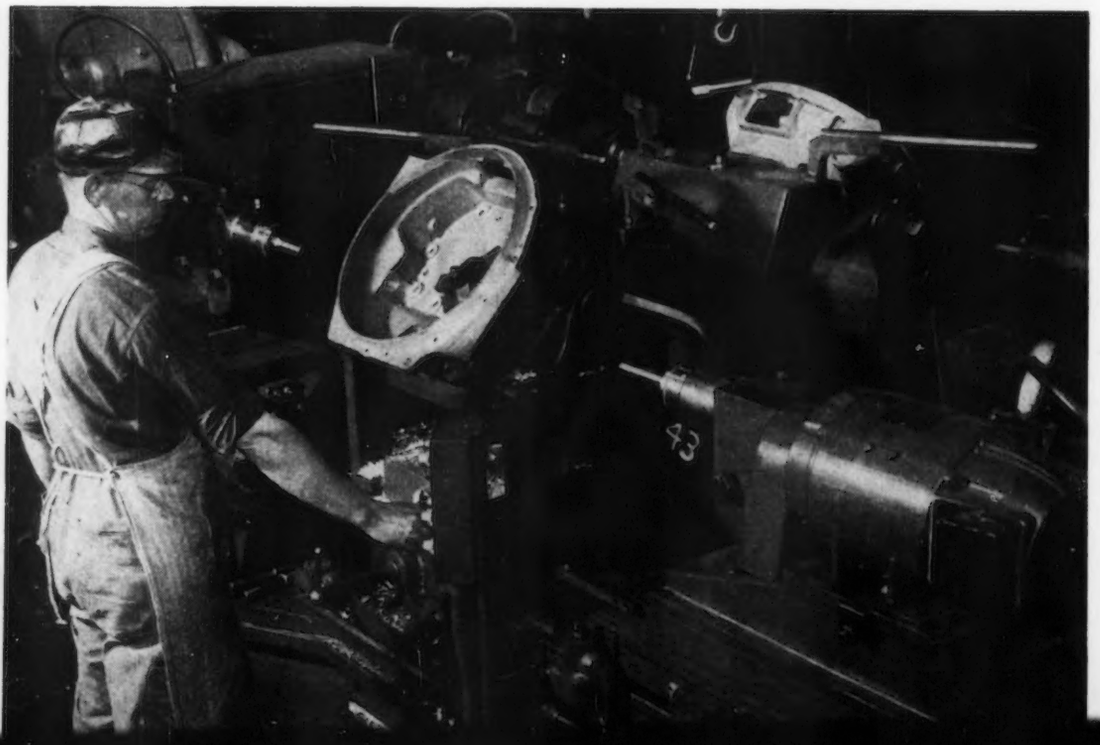

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FIG. 2—With the parts in position for machining, the operator is about to start the cutting cycle. The operator unloads, loads and indexes the fixture, and then starts the machining cycle. Drilling is done on the far side of the machine and boring on the operator's side.

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The machine and fixturing arrangement, the latter shown in fig. 1 and the machine setup shown in fig. 2, were designed and built by Snyder Tool & Engineering Co., Detroit, for the Spicer Mfg. Div. of the Dana Corp., Toledo. It has been in operation for nearly a year on bell housing for automotive and agricultural equipment. It was designed as a high production machine, with high speed machining cycles.

The workpiece is manually clamped in each of two stations on a manually rotated indexing table that is mounted centrally between the slides, as shown in fig. 1. The two stations permit simultaneous drilling and boring. Four hydraulically actuated tool slide units are mounted horizontally and opposed in pairs, front and rear. The two rear slides are equipped with single spindle drill heads and are used to drill the cross shaft holes in the housings. The two front slides are equipped with Parker boring spindles for finish line boring the holes. These front slides are provided with micrometer adjustment, permitting precision setting of the finish boring tools, which are tungsten carbide.

The tool-head slides, which move on hardened and ground ways, one flat and the other V-type, are lubricated from a pump and tank unit mounted at one end of the machine. Slide feed rates are controlled by individual feed control valves.

The fixtures are actually identical, two separate fixtures joined in the rear, one part for each working station. Each of these two parts has two general adjustments. The first is an up-down, in-out adjustment, accomplished through the means of locating pins much in the order of the spacing on a jig borer. The second adjustment is in the work-holding part of the fixture, utilizing a series of machined rings, locating pins and mating holes in the work rest plate for positioning the work and various sized spider clamps for holding it.

The arrangement permits positioning and clamping 76 different sizes of cast iron and aluminum bell housings. Positioning of the parts is from the machined, removable disks in the face of the fixture. These disks fit into circular machined holes in the bell housings and are listed in table I as the part locating rings. Two of each size ring are required, one for each station. These rings, while accurately positioning the parts in the fixture, also govern tool positions. One can be seen on the fixture in fig. 3, as a part is about to be mounted. The holes are drilled and bored from opposite ends of the machine through the machine guides into the bell housings. These holes must be perpendicular to the vertical axis of the housing and must be in alignment with each other, with an alignment tolerance of 0.001 in. Testing of alignment is by running a hardened and ground bar of precise diameter through the aligned holes without seizure.

Each of the 76 bell housings is of different dimension, so that in order to accommodate all of the jobs, a series of adjustments to the fixture is required. The fixture can be positioned horizontally or vertically in the machine by tool steel locating pins, oil hardened and ground. Typical

FIG. 3—The operator is loading the fixture and the part locating ring and pilot locating pin holes can be seen in the master rest plate of the fixture.

of the pin sizes required to locate the 76 housings are those shown in table I as vertical and horizontal locating pins, and four of each are required in each machining setup.

Using these pins in the drilling and boring machine assures accurate and rapid location of the fixture body in horizontal and vertical planes. Vertical movement of the fixture is controlled by the nut on the top of the fixture, shown in fig. 1, and horizontal movement is controlled by the nut on the lower front of the fixture. These controls permit movement of the fixture so that the locating pins can be inserted into the machine and, by proper selection of these pins along with proper selection of the part locating ring, on the master rest plate of the fixture in fig. 1, the various bell housings are positioned in the machine in correct relation to the tools. The part locating rings are carburized, hardened and ground.

Through a system of locater pins, circular location of the bell housing in the fixture is achieved. A locater pin is placed through a drilled hole in the housing into the master rest plate, assuring against any circular movement of the part while it is being machined. Each pin is numbered to correspond to a number on a hole in the master rest plate into which it must fit. There are 22 bored and bushed holes in the master rest plate to accommodate pins for 22 positions of the housings, as shown in fig. 1.

Up through the center of each of the two fixtures is a 1½ in. anchoring stud or bolt. After the fixture is adjusted vertically and horizontally,

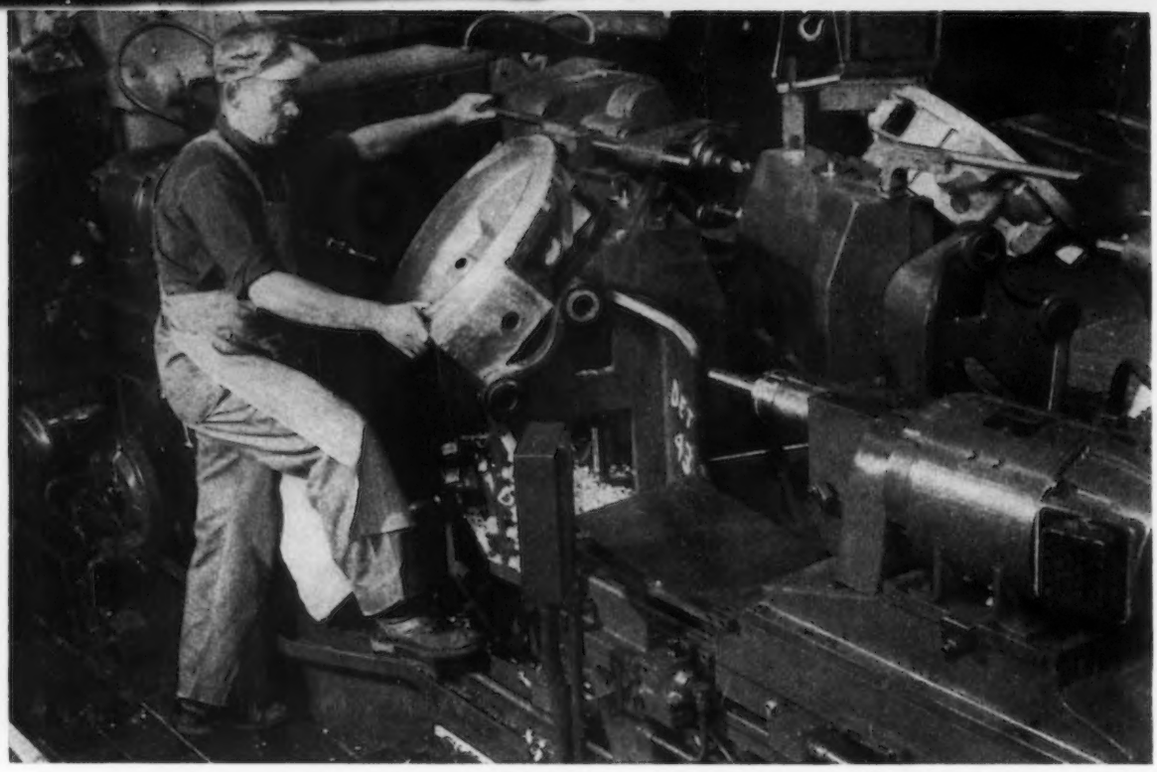

FIG. 4—The fixtures are indexed manually, and loading and unloading is done on the boring side of the machine to utilize the non-cutting time while the slower drilling operation is being completed.

the pilot ring and pin is in position and the part is in place, a cast steel spider C-clamp is slipped onto the stud and the nut is tightened to bring pressure on the housing through the three legs of the spider clamp, as shown in fig. 3.

After proper positioning and clamping, the operator starts the machine cycle. The part is manually indexed to the far side of the machine for drilling, and the part on the far side indexes to the operator side for boring and unloading. Indexing is shown in fig. 4.

Drilling and boring speeds are controllable through a duel combination of a variable speed motor with rheostat control and a gearing arrangement on the drill heads. Various tool sizes and spindle speeds for some of the 76 bell housings to be machined are shown in table I. Bored holes range from 0.875 to 1.875 in. diam, while drill sizes range from 27/32 to 1 27/32 in. diam. Spindle speeds on the boring side of the machine range from 1019 to 2183 rpm, and the drill speeds range from 167 to 1048 rpm. The lower values are, generally, for larger holes in cast iron parts and the upper ones for aluminum parts. Boring is done with carbide tipped tools and nine different sets of boring bars are needed to accommodate the range of parts machined.

For the drilling operations, the problem was to go beyond the span of motors available. Gear ratios had to be changed because of the scope of the work. Drill heads are driven by 2 hp, 14T-frame variable speed motors. The motor speed ranges from 850 to 3000 rpm. By the use of a gear train setup along with the variable speed feature of the motors, spindle speeds can be regulated at will within the range of 167 to 1048 rpm.

There are two change gears in the gear train arrangement and four stationary gears. One change gear is a 32 tooth, 4.2567 in. PD gear with a 20° left helix, and the other is a 24 tooth, 3.1928 in. PD gear with a 20° right helix. With the drill head motor speed set at 3000 rpm and the change gears set with the 32 tooth gear on the motor spindle, the drill head spindle is 1048 rpm. With the motor speed at 850 rpm with the same setup, the drill spindle speed is 297 rpm.

By reversing the change gears, and placing the 24 tooth gear on the motor spindle and the 32 tooth gear on the drill head spindle, the speeds are changed. With the motor at 3000 rpm with this arrangement, the spindle speed is 589 rpm, and with the motor speed at 850 rpm the drill head spindle is 167 rpm.

In addition to the direct gearing speed control, the rheostat control on the variable speed motors gives an infinitely variable range of speeds to the drill heads between the upper and lower limits. This permits the use of any drill size required, since the surface speed of drilling can be controlled quite accurately to the remainder of the fixture and to the machine itself.

An examination of table I shows by part numbers typical parts handled in this fixturing arrangement, the material of which they are made, tool sizes and spindle speeds in the two boring heads, and drill diameters, lengths, and speeds of the two drill heads. Also shown for these tooling arrangements are the details of the vertical

and horizontal locating pins; and the thicknesses and diameters of the pilot locating rings required for drilling and boring the 76 different bell housings.

The extreme flexibility of fixturing on this special machine has not only increased its usefulness, but has eliminated hours of machining time on conventional equipment. The extended usefulness of this machine through the ingenious fixtures has resulted in the machine paying for itself in a relatively short period of time. This is an excellent example of full utilization of a special purpose machine, since there is an insufficient number of parts of any one size to be machined to keep a similar machine with a static fixture busy all of the time.

. . . NEW BOOKS . . .

"Le Polissage Electrolytique des Surfaces Metalliques et Ses Applications," (Electrolytic Polishing of Metal Surfaces and Applications of the Process), by P. A. Jacquet. Volume I of a series of books on electrolytic polishing by one of the world authorities describes processes for aluminum, magnesium and the light metal alloys. In French. Editions Metaux, 32 Rue de Marechal Joffre, Saint-Germain-en-Laye (S.-&-O.), France. 3,600 francs. 359 p.

* * *

"Motion and Time Study," by R. M. Barnes. Third edition of this book incorporates findings of time study surveys conducted in 80 factories and, in addition, chapters on process analysis, gang process charts, activity charts, and man and machine charts have been added. John Wiley & Sons, 440 Fourth Ave., New York 16. $5.00. 560 p.

* * *

"Prevention of Iron and Steel Corrosion," by C. Dinsdale. Book attempts the compilation of a complete index of processes and published specifications relating to the prevention of the corrosion of iron and steel. Iliffe & Sons Ltd., Dorset House, Stamford St., London, S.E.1. 5 shillings plus postage. 67 p.

* * *

"Evaluation of Residual Stress," by K. Heindlhofer. Advanced treatise deals with the nature, detection, measurement and analysis of residual stress. The limitation imposed on stress analysis by anisotropy as exhibited by metals having a pronounced preferred orientation is discussed. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $4.00. 196 p.

* * *

"1948 ASTM Standards on Copper and Copper Alloys." Publication includes 106 standard specifications, details of test methods, definitions of terms and other information covering copper and copper base alloy products. American Society for Testing Materials, 1916 Race St., Philadelphia 3. $5.00. 516 p.

* * *

"Drilling and Surfacing Practice," by F. H. Colvin and F. A. Stanley. Practices in drilling and surfacing operations, including drilling, reaming, tapping, planing, shaping, slotting, milling and broaching, are discussed in revised edition. Data on drills, tables on step-drilling, designs and uses for reamers and taps, and improvements in the field of milling equipment and carbide cutters are included. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $5.00. 523 p.

* * *

"The Management of Marketing Costs," by J. W. Culliton. Study of manufacturers' marketing costs emphasizes the need for determining which costs in a business are specifically marketing costs and discusses the day-to-day operations concerned with marketing decisions. Harvard Business School, Div. of Research, Boston 63. $2.50. 166 p.

* * *

"Turning and Boring Practice," by F. H. Colvin and F. A. Stanley. Revised third edition of this book is a guide for boring and turning machine operation. It discusses principles and problems, describes varieties of machines and methods of operation, and includes data on speeds, feeds, cutting materials and the use of coolants. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $4.75. 574 p.

* * *

"Design of Industrial Exhaust Systems," by J. L. Alden. Principles of exhaust ventilation for the removal of undesirable heat, fumes, dust or otherwise contaminated air are reviewed in revised edition of this book. Design of hoods, piping and other structural information is included. Industrial Press, 148 Lafayette St., New York 13. $3.50. 252 p.

* * *

"Custom House Guide" (1948 Edition). The 86th edition of this foreign trade guide lists the new import duties on more than 30,000 commodities and gives statistics on port activities, facilities and charges. A directory for shippers and those in allied trades, U. S. Custom Regulations and other information is also included. Custom House Guide, Box 7, Sta. P., Custom House, New York 4. $25.00. 1620 p.

* * *

"The Waste Trades Annual and Directory." British publication gives information on scrap and waste handling, and lists firms from all countries trading in scrap metals, rubber, paper and other materials. United Kingdom Waste Materials Regulations are included. British-Continental Trade Press Ltd., Suite 1508-A, 225 W. 34th St., New York. $5.00. 346 p.

Grain Refinement In

Since aluminum alloys do not undergo a phase change in the solid state, control of grain size must be effected in the melt. The influence of various elements upon the crystallization characteristics of aluminum is discussed in this article, and data are presented evaluating the effects of (1) elements reported to be grain refiners, (2) those which form commercial alloys and (3) elements classed as impurities in commercial aluminum.

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ALUMINUM alloys do not undergo a phase change in the solid state which would permit grain refinement by heat treatment. (The grain referred to is the grain of the macrostructure visible to the unaided eye after suitable preparation). Control of grain size in aluminum castings, therefore, must be effected in the melt. The advantages associated with fine grain size are, in brief, improved casting and working properties, higher and more consistent mechanical properties, shorter solution times in heat treatment and superior surface appearance.

This article is concerned with the effects of individual elements upon the crystallization characteristics of commercially pure aluminum (99.81 pct). The elements were selected for test on the basis of three criteria: (1) Elements reported to be grain refiners—titanium, boron, etc.; (2) elements which form the commercial alloys—copper, magnesium, etc.; and (3) impurities in commercial aluminum—iron, manganese, etc.

For each grain size determination, an experimental ingot weighing approximately 355 g was melted and cast in a Dixon Plumbago crucible, without cover. Melting was done in an electrical resistance Hoskins type muffle furnace, equipped with Leeds and Northrup Micromax Recorder and Control.

The melting practice employed in the preparation of each ingot is as follows: (1) heat crucible to furnace temperature, (2) melt aluminum, (3) add alloy and stir with graphite riser rod, (4) hold for ½ hr, then stir, (5) hold for ½ hr and remove crucible from furnace and cool in air.

This procedure was employed to insure (as far as practicable) like conditions of melting and freezing for each ingot. Agitation of the melt produced by pouring was avoided. Similarly, the chilling effect of pouring into a mold was eliminated. The total melting operation lasted about 2 hr. After the crucibles were removed from the furnace, chromel-alumel thermocouples attached to a Leeds and Northrup Micromax Recorder Type S were immersed in the melt, and autographic cooling curves were obtained for two different compositions. The curves are shown in fig. 1.

This investigation of grain refinement in aluminum and its alloys is sponsored by the Office of Naval Research under Project 62-47, initiated June 1, 1947.

It proved feasible to introduce the manganese, chromium, iron, tin, zinc, silicon and antimony directly into the melt without preparing master alloys. In the cases of manganese, chromium, iron and tin, this was done by powdering the metal and enclosing it in an aluminum foil (2S) envelope, which was added to the melt. All other additions were made with master alloys.

Each ingot was cut in half lengthwise and 25 g of millings from the center of one half served for chemical analysis. The cut surface of the other half was prepared for examination of the crystalline structure. The copper series was etched in cold NaOH followed by a wash in dilute HNO_3. For zirconium, magnesium, tin, antimony, nickel, boron and tungsten, a mixture of HF, HNO_3 and HCl was used. The others were etched in HCl, $FeCl_3$ and HF.

The average grain diameter was arrived at by scanning the equiaxed area with the various size grids and selecting that grid conforming most nearly to the size of the grains. For grain sizes

Cast Aluminum

By VINCENT DePIERRE
and
HAROLD BERNSTEIN
Senior Metallurgist and Associate Materials Engineer, respectively, U. S. Naval Gun Factory, Washington

larger than 2.54 mm, an average grain was selected and measured directly, using a Filar micrometer eyepiece and a magnification of 7.5 diameters. The grain diameters and ingot analyses are reported in table I. The refining effects of titanium, zirconium and copper are pictured in figs. 2, 3 and 4, and illustrated graphically in fig. 5.

Material from the equiaxed zone of each ingot was polished, etched in Kellar's reagent and photographed. Typical microstructures appear in fig. 6. The titanium and zirconium alloys

TABLE I

Ingot Analyses and Grain Size Measurements

GROUP 1

Element, Pct	Grain Diam, Mm	Element, Pct	Grain Diam, Mm
Ti — 0.02	1.60	B — 0.02	1.88
0.08	0.52	0.03	1.60
0.14	0.47	0.035	1.32
0.18	0.20	0.05	1.13
0.22	0.18		
0.31*	0.18		
W — 0.03	....	Cb — 0.004	2.54
0.06	....	0.01	1.88
0.10	2.54	0.02	1.60
0.16*	0.66	0.05*	1.32
Zr — 0.01	....	Mo — 0.06	....
0.06	....	0.12	....
0.14	....	0.25	....
0.16	1.13	0.28	1.60
0.18	0.94	0.31	1.60
0.22*	0.94	0.36*	1.13

GROUP 2

Mg — 0.31	1.88	Ni — 0.06	....
0.65	1.60	0.27	2.54
1.04	1.32	1.07	2.54
2.48	0.94	2.66	1.88
5.70	0.47		
6.70	0.47		
Cu — 0.58	....	Sn — 0.38	....
1.14	1.88	0.83	2.54
2.17	1.60	1.36	2.54
3.17	1.32		
4.27	1.13		
5.41	0.94		
Zn — 0.45	....	Mn — 0.18	....
1.17	2.54	0.73	....
2.82	1.88	1.34	2.54
5.62	1.60		
Fe — 0.21	....	Si — 0.08	....
0.59	....	0.28	2.54
1.46	1.88	0.68	2.54
		2.31	3.81
		3.31	3.81
		4.92	3.81
		7.40	3.81

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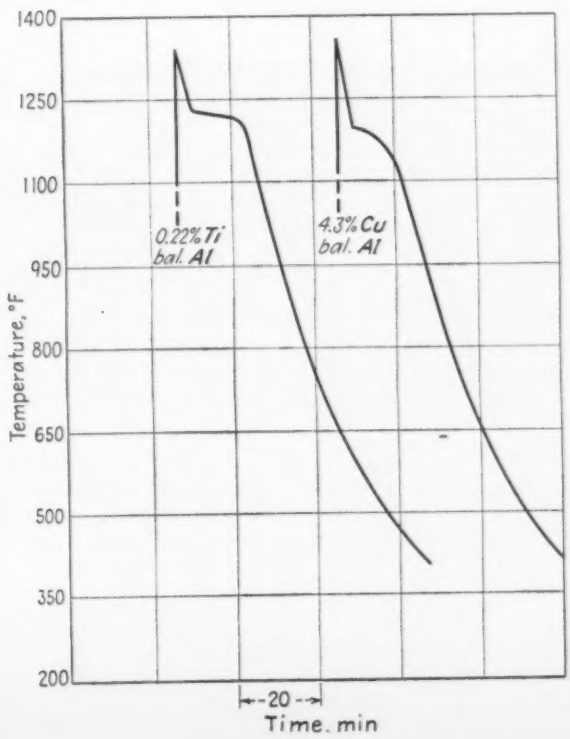
Cr — 0.02	....	Co — 0.09	2.54
0.19	....	0.26	2.54
0.25	....	0.54*	2.54
0.46*	....		
Be — 0.05	....	Sb — 0.06	....
0.37	2.54	0.17	....
0.70*	2.54	0.44*	2.54

* Saturation Point.

FIG. 1—Autographic cooling curves for two melts as cooled in air after removal from furnace at 1350° F.



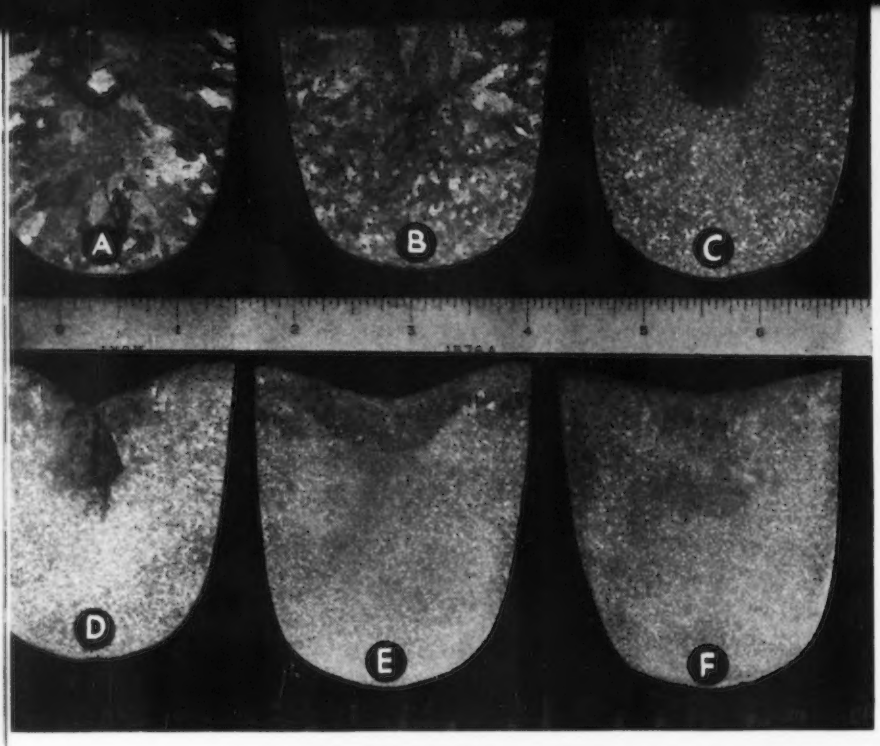


FIG. 2—Effect of titanium upon the grain of 99.81 pct Al, as-cast from 1350°F. Titanium contents are as follows: (A) 0 pct; (B) 0.02; (C) 0.08; (D) 0.14; (E) 0.18; (F) 0.31.

were made up, for the most part, of aluminum with a few intermetallics. The zinc alloy is a solid solution and the copper alloy has a cored structure with copper aluminide constituent concentrated along the grain boundaries.

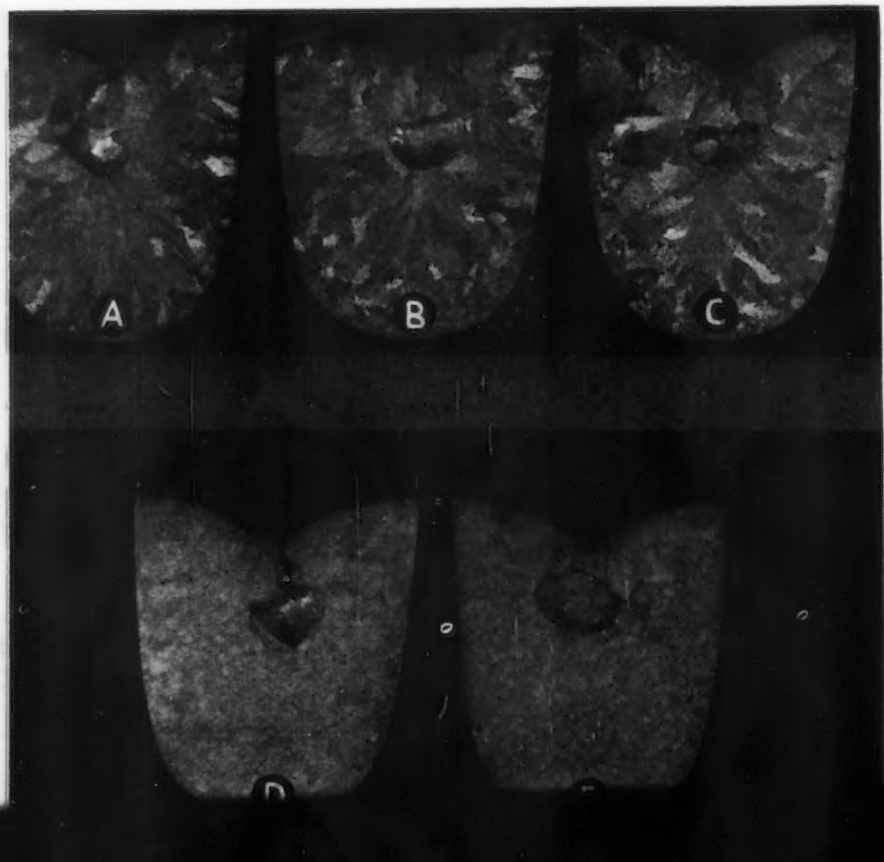
Crystallization Characteristics

It is generally recognized that the process of solidification in a molten metal begins with a nucleus, assumed to be a solid particle suspended in the melt, which acts as a center of crystallization. Each nucleus initiates one crystal and the final grain size (a grain represents an interrupted or imperfect crystal) depends upon the number of nuclei participating and the rate of crystal growth. In general, the greater the number of nuclei, and the slower the velocity of crystallization, the finer will be the average grain size.

The occurrence of nuclei and the rate of crystal growth may be influenced by variation of the composition of the melt, or by variation of the melting practice and cooling conditions. It is possible, for example, to secure fine-grained aluminum (99.81 pct) by casting in a chill mold. In this investigation, the melting practice and the conditions of solidification have been held constant. Any variation in grain size from the standard (99.81 pct A1) may be directly attributed to the effect of the addition element.

The primary crystallization characteristics of three ingot series are illustrated in figs. 2, 3 and 4. The aluminum standard is composed mainly of large columnar grains radiating from the ingot surface toward the ingot center. A small equiaxed zone is visible around the lower periphery. With the addition of alloying elements, the columnar grains generally are replaced by equiaxed grains, and effective refinement occurs from this point on. A small columnar belt usually persists near the top of the finest grained ingots.

FIG. 3—Effect of zirconium on the grain of 99.81 pct Al, as-cast from 1350°F. Zirconium contents are as follows: (A) 0 pct; (B) 0.06; (C) 0.14; (D) 0.16; (E) 0.18.



Fourteen of the 18 elements investigated fall into two groups on the simple basis of weight percentage needed to accomplish refinement. Group 1 includes six elements which refine at very low weight concentrations: titanium, tungsten, zirconium, boron, molybdenum and columbium, in that order of refining ability. These elements possess high melting points, from 3272°F for titanium to 6066°F for tungsten. Their solubility in aluminum at ordinary melting temperatures (about 1350°F) is very limited, the maximum being 0.36 pct for molybdenum.

Group 2 is composed of eight elements which require sizeable weight concentrations to refine or modify; magnesium, copper, zinc, iron, nickel, tin, manganese and silicon, in that order of effective-

ness. Their melting points fall in the lower end of the temperature scale, ranging from 449°F for tin to 2795°F for iron. Their solubility in aluminum at 1350°F varies from 4 pct for iron to 100 pct for tin and zinc.

There is a further subdivision in the elements of group 1 with respect to the effect of graduated additions of the elements. Titanium and columbium refine progressively with larger additions; tungsten, zirconium and molybdenum exhibit a threshold phenomenon. The first additions have little effect on the grain characteristics of the ingot. Once a certain concentration is reached and surpassed, refinement is sudden and practically complete (fig. 4). This confirms the behavior of zirconium previously reported.[1]

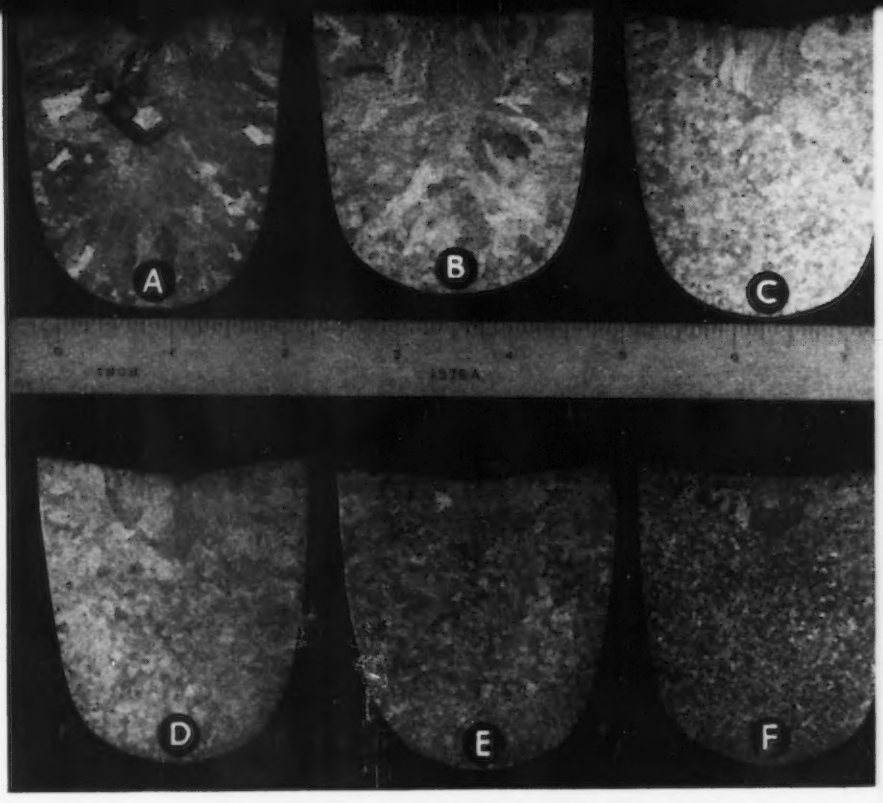


FIG. 4—Effect of copper on the grain of 99.81 pct Al, as-cast from 1350°F. Copper contents are as follows: (A) 0 pct; (B) 0.58; (C) 1.15; (D) 2.17; (E) 3.17; (F) 5.41.

The sudden reduction in grain size has been associated with the appearance of a peritectic reaction.[2] The explanation is that the first crystals which precipitate from the melt are broken up by the peritectic reaction and the resulting fragments act as nuclei. Both zirconium and molybdeum undergo peritectic reactions with aluminum near the 100 pct aluminum ordinate, but tungsten has a eutectic point in the same area.[3] The refining ability and the progressive refinement (with increasing amounts of titanium) has been ascribed to the slowness of diffusion of titanium as $TiAl_3$ through the melt.[4]

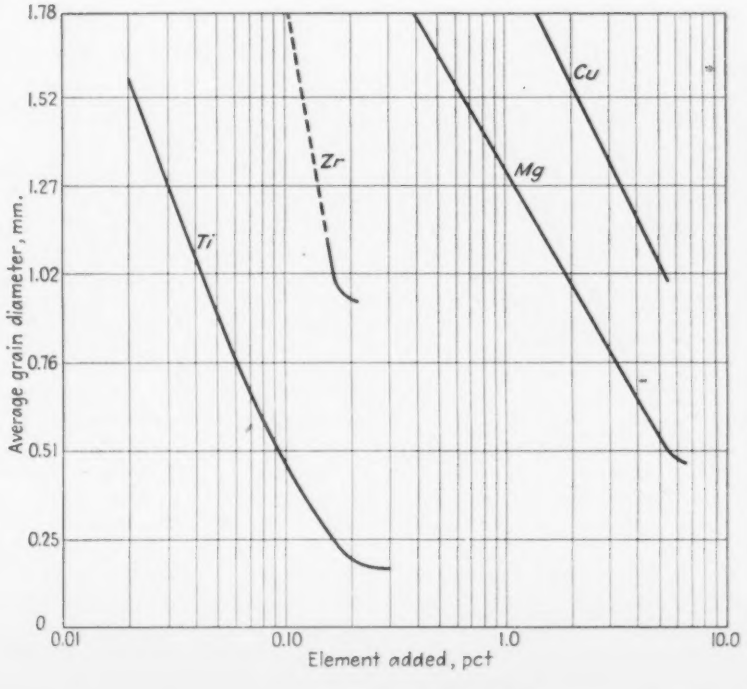
The evidence in favor of peritectic refinement is inconclusive. On the negative side, the very limited solubility of titanium as $TiAl_3$ in molten aluminum at ordinary temperatures makes questionable the effectiveness of a reaction between $TiAl_3$ and the melt at a temperature lower than the original and under cooling conditions which deviate radically from the requirements of equilibrium

The high melting points and limited amounts involved of the elements in group 1 indicate that they participate directly in the formation of fine colloidal particles which act as centers of crystallization and are stable in molten aluminum under ordinary conditions of time and temperature.

Grain Characteristics Influence Grain Size

From the relatively large amounts used of the elements in group 2, it appears that refinement is indirectly accomplished by altering certain physical characteristics of the melt, such as viscosity, surface tension, diffusibility, etc. This, in turn, may affect the rate of nucleation or the velocity of crystallization. It has been reported[5] that the progressive refinement of aluminum by additions of magnesium is due to the effect of changes in surface tension on the devel-

FIG. 5—Effect of refining elements upon grain size of cast aluminum (99.81 pct Al).



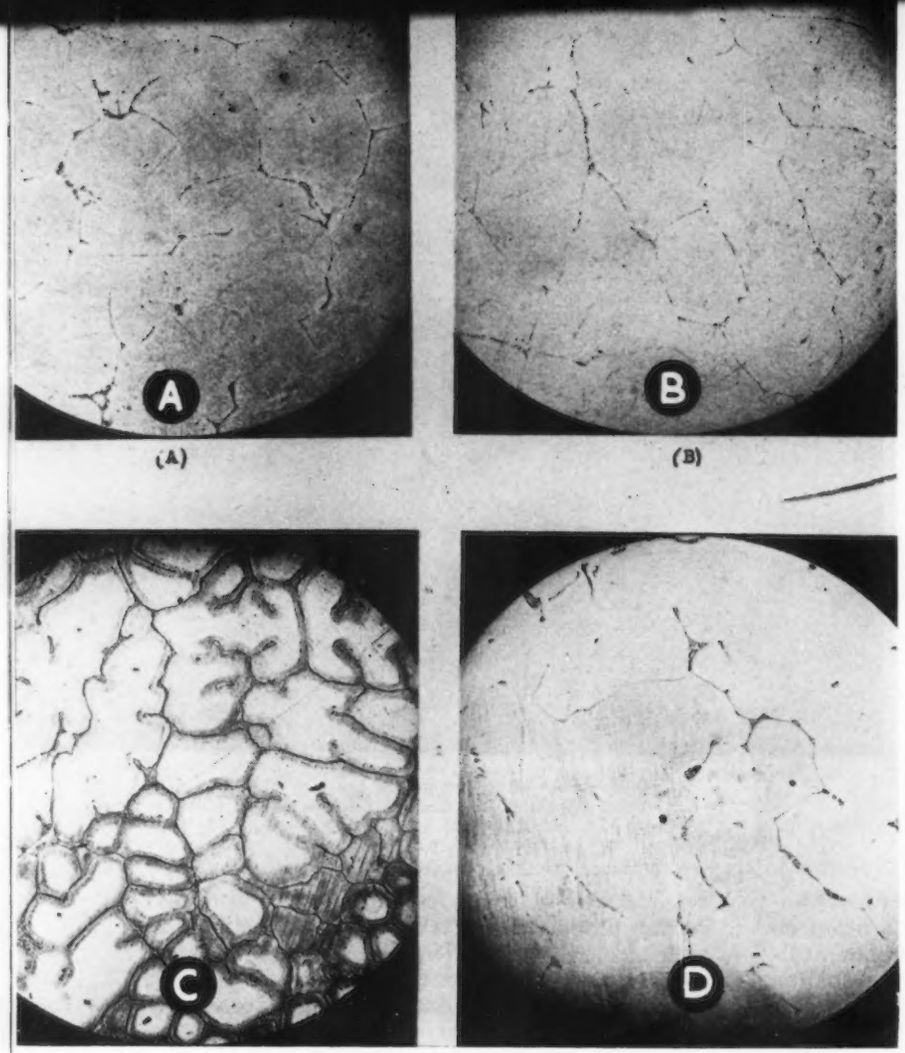


FIG. 6—Typical microstructures of aluminum containing (A) 0.08 pct Ti, (B) 0.22 pct Zr, (C) 4.27 pct Cu and (D) 5.51 pct Zn. Etchant-Kellers. 75X.

opment of centers of crystallization.

Chromium, beryllium, antimony and cobalt have not been classified because of their limited solubility and lack of effect upon grain size within their solubility range.

In a previous investigation[1] certain elements including chromium, beryllium and manganese were found to have a coarsening effect on the grain size of 4.5 pct copper-aluminum alloy. No distinct coarseners (for aluminum) were encountered here.

For their help in carrying out this project, acknowledgements are due Lewis H. Fawcett, principal metallurgist, and the personnel of the Materials Laboratory of the Naval Gun Factory.

Conclusions

Based on the classical theory that the number of grains per unit volume formed on cooling a molten metal is a direct function of the number of nuclei in the molten metal and an inverse function of the velocity of crystal growth, the following conclusions are drawn:

(1) Commercially pure aluminum (99.81 pct) has an extremely coarse grain in the solid state when slowly cooled from the liquid state because few nuclei are present in the molten metal, few nuclei are formed on slow cooling, the velocity of crystal growth of the pure aluminum is not lowered by the small amount of impurities present and sufficient time from grain growth is furnished by slow cooling.

(2) The fine grain produced by addition of small amounts of refractory metals such as titanium or tungsten to aluminum slowly cooled from the molten state is due to the large number of nuclei produced by the additions.

(3) The refinement produced by the addition of substantial amounts of elements like magnesium or copper to aluminum slowly cooled from the molten stage is probably due to slight increase in number of nuclei and a lower velocity of crystal growth caused by the additions.

References

[1] H. G. Bowen, Jr., and Harold Bernstein, "Effect of Sixteen Alloying Elements Upon the Grain Size of Cast 4.5 Pct Copper-Aluminum Alloy," Trans., ASM, vol. 40, 1948.

[2] A. Portevin, "Refinement of the Structure of Castings," Foundry Trade Journal, Oct. 27, Nov. 10 and Nov. 17, 1938.

[3] L. F. Mondolfo, "Metallography of Aluminum Alloys," John Wiley and Sons, New York, 1943.

[4] W. E. Sicha and R. C. Boehm, "Effect of Titanium on Grain Size and Tensile Properties of an Aluminum—4.5 pct Copper (No. 195) Casting Alloy," Reprint No. 48-16, American Foundrymen's Assn.

[5] Paul Bastien, "Study of the Solidification Grain Size in Light and Ultra-light Aluminum-Magnesium Alloys," Revue de Metallurgie, No. 7, July, August, 1940.

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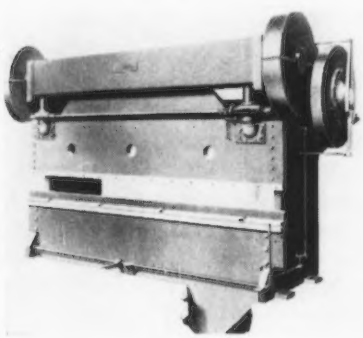
New Production Ideas . . .

New and improved equipment described this week includes power press brakes, a special machine for finishing oil pumps, flash trimming machines, forming presses, sheet cutting machines, vertical bending rolls, a metal analyzer, and various small tools and accessories such as a broken tool remover, an adjustable blade chaser, magnetic chucks, torque control couplings, and self-locking nuts.

AVAILABILITY of Columbia power press brakes in a complete size range from 120 to 900 tons has been announced to give metal fabricators a choice of models for forming mild steel ⅛ to 1 in. thick in lengths from 4 to 20



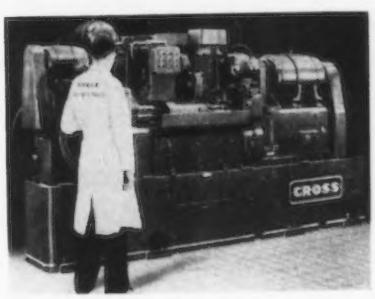
ft. All sizes except the 120-ton model employ twin-drive main gears. Back gears operate in oil within an oil-tight case. Motor-driven slide adjustments have micrometer controls. The slide can be adjusted out of parallel with the base. Slide ways are designed to provide full bearing with the housing guides, even when the slide is operated out of parallel. A wedge-type release mechanism relieves the ram in case the dies are bottomed sufficiently to stall the brake. The presses have a maximum deflection of 0.001 in. per ft of machine width. *Columbia Machinery & Engineering Corp. For more information, check No. 1 on the attached postcard.*

Induction Motors

A NEW line of extra-low starting kva squirrel cage induction motors is available in flange-mounted type and coupled two-bearing type for direct coupling to 514, 600 and 720 rpm air compressors. The line permits full-voltage starting across the line, with a starting kva of only 425 pct. Full voltage starting is better from the standpoint of power supply and requires simpler, lower cost control equipment. Motors are available from 60 to 250 hp. *Electric Machinery Mfg Co. For more information, check No. 2 on the attached postcard.*

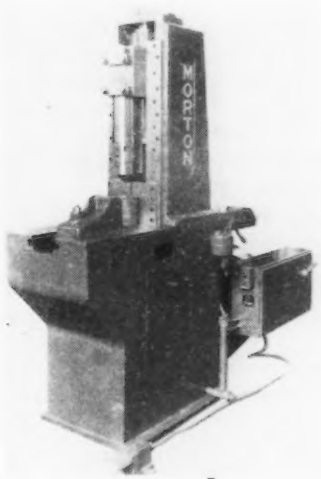
Oil Pump Finishing

COST of finishing oil pumps is claimed to be sharply reduced with a special machine that performs operations at the rate of 65 pieces per hour. These operations include milling both ends, drilling two mounting holes, drilling and tapping four cover holes, drilling and reaming two bearing holes, roughing and semi-finishing two gear pockets, and forming a pressure relief cavity. The machine has a 10-station, power operated index trunnion, with an independent station for loading and unloading while the machine is operating. It cuts nine pieces at a time progressively. Special features include a fluid drive index with overload protection; automatic relief for milling cutters during the return stroke; hardened and ground steel ways; hydraulic feed for drilling, reaming and milling; and lead screw feed for tapping. *Cross Co. For more information, check No. 3 on the attached postcard.*



Flash Trimming Machines

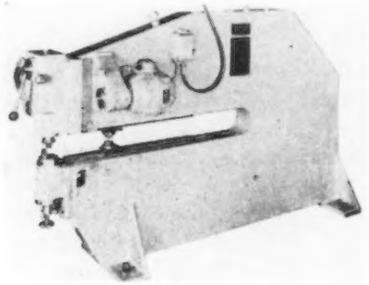
TWO machines, a vertical flash trimming machine for small motor frames and other cylindrical parts, and a new high production flash trimmer for strip stock and bicycle rims or other cylindrical parts have been announced. The vertical unit has a capacity of 4½ to 9 in. diam, 8 in. length of stroke and stock thickness up to ¼ in. maximum. It is hydraulically operated and has a cutting speed of 50 fpm and a return speed of 100 fpm. The work clamping fixture is hydraulically operated and may be adjusted toward or away from the back clamping dies to take care of variation in work diameters. Automatic operation of clamp, cut, return and unclamp is provided with foot pedal control. The high pro-



duction trimmer handles strip stock or cylinders up to 4 in. wide and 3/32 in. thick. Constant cut and return stroke is provided. Vertical movement between dies is 1½ in. for entering and removing work. Provisions are made for shortening total length of ram travel. *Morton Mfg. Co. For more information, check No. 4 on the attached postcard.*

Sheet Cutting Machine

BEADING, folding, and straight, circular or design cutting of metal up to ⅜ in. thick is possible on a new sheet and plate working machine. Cutting is accomplished by two tools, the upper one oper-



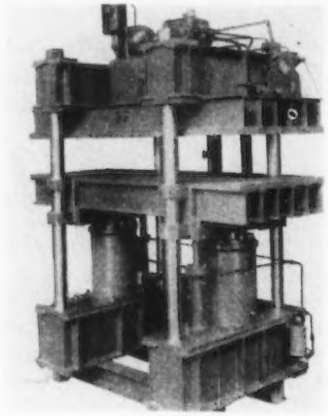
ating at a very high rpm. The cutters do not penetrate the metal, but shear the metal to the breaking point, making a smooth cut. It does not chip or deform the metal being worked but finishes edges smooth and perpendicular so that no reworking is necessary. A quick-locking centering device permits fast production of circular plates. Seven sizes of machines are available. *Pullmax Co. For more information, check No. 5 on the attached postcard.*

Ejector Pins

EJECTOR pins used in die casting and plastic molding industries are being manufactured from a special alloy steel, heat treated to insure highest wear resistance and maximum toughness. They are then precision ground to close tolerances thus allowing for standardization and interchangeability. *Jamison Steel Corp. For more information, check No. 6 on the attached postcard.*

Forming Press

DESIGNED especially for forming special signs, the 350-ton press illustrated is adjustable in tonnage between 85 and 350 tons and is furnished with motor-driven pumping unit, control valves and piping, with pump volume and press speeds adjustable from zero to maximum. The pumping unit, essentially composed of a 14.7 gpm, 2000 psi radial piston pump



driven by a 15-hp electric motor, is mounted on the top platen. This special forming press is made in models, sizes and capacities to meet all requirements. *R. D. Wood Co. For more information, check No. 7 on the attached postcard.*

Vertical Bending Roll

A VERTICAL plate bending roll has been developed for rolling large diameter cylinders of light

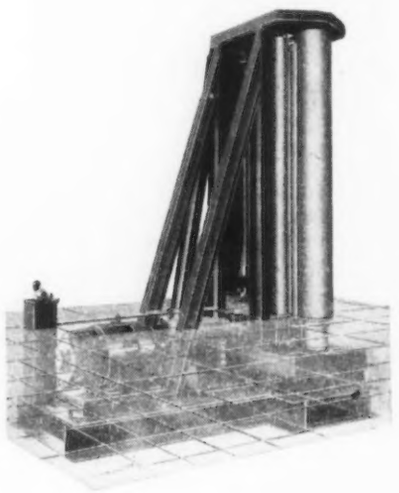
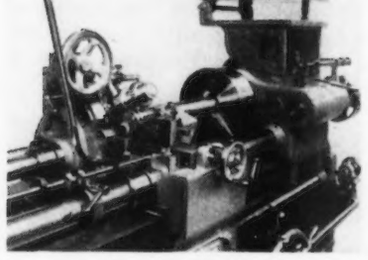


plate where true diameters must be held during the bending process. The sheet, handled with a jib crane, is inserted on edge into the machine. As it is ejected from the rollers it is said to hold a true diameter because horizontal stress on the rolled plate is greatly reduced. *Webb Corp. For more information, check No. 8 on the attached postcard.*

Thread Generating Machine

ADAPTED for the production of machine tool lead screws, feed screws, worms and similar parts, an automatic thread generating machine employs the Cornelis principle of a type of worm which contacts the worm gear over its full length instead of engaging only at the mid-section. In this design, driving the cutter directly from the wormwheel is said to

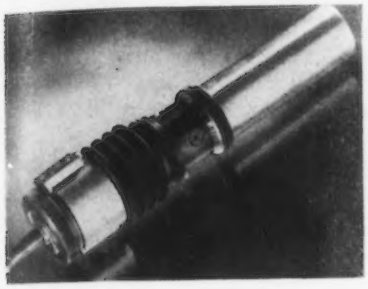


eliminate any errors that might be introduced by change gears, backlash of couplings and keys. Because both the work and the master screw are equally supported in bushings, bending or sagging from their own weight is avoided. The profile of the high speed steel cutters is ground by a special Cornelis process that reproduces the correct shape of the thread and retains the same pressure angle unchanged on flanks after successive sharpening of the cutter. Two types are available, a plain heavy duty machine with special heavy saddle and outboard support of the cutter spindle; and a universal machine for general production of lead screws and threads. *George Scherr Co., Inc. For more information, check No. 9 on the attached postcard.*

Small Recessing Tools

TWO new small size recessing tools are comparable in capacity to standard tools, but their extremely small dimensions permit their use in applications where larger recessing tools can not be used. The tools have a micrometer-adjusting collar that facilitates rapid and accurate recess diameter control to 0.001 in. The tool

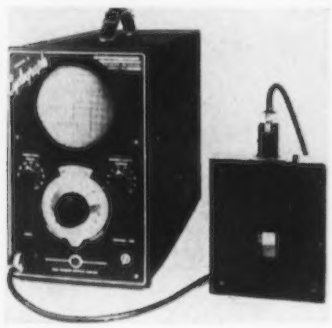
holding section has serrated clamp blocks that match identical serrations on cutter shanks to provide positive interlock and to prevent



turning of the cutter in the workpiece. Precision hard-chromed wearing surfaces assure maximum tool life. Models No. 1 and No. 2 tools have overall length of 2 13/16 and 4 in. They cut recesses from 3/8 to 1 in. and from 1 to 2 in. Cutting action is smooth and requires only finger-tip feeding pressure. *Maxwell Co. For more information, check No.* 10 *on the attached postcard.*

Metal Analyzer

A NEW portable instrument operating on the core loss principle, the Model C Cyclograph is designed for rapid and nondestructive metallurgical examination and sorting of metal parts. The unit is said to be particularly applicable to checking or sorting on the basis of analysis, structure, hardness, case depth and in some cases stress concentration. Test frequencies range from 2 to 200 kc. This instrument also traces internal stress changes, compares stresses at different lev-



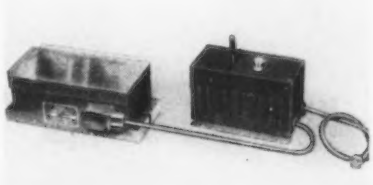
els, or measures stress in psi by calculation. A recorder output is provided for this use. The unit weighs 50 lb, operates on 115 v, 40-60 cycles and power consumption is 70 w. *J. W. Dice & Co. For more information, check No.* 11 *on the attached postcard.*

Portable Polisher

A NEW 10-in. portable electric polisher features vertical spindle construction, and has been designed to make power polishing a fast, effortless operation, obtaining a hard, brilliant luster finish on all types of smooth surfaces. The vertical spindle construction produces a smooth-running tool. Smooth power is transmitted in a straight line from motor to spindle. A lightweight aluminum housing completely encloses the tool and the rear grip has an instantaneous trigger switch with positive lock for continuous operation. The side handle is detachable. The polisher is driven with a universal ac-dc 110 v motor, 25-60 cycles, 5.5 amp, at 1000 rpm free speed; 700 rpm load speed. Net weight of the tool is 10 lb. *Bradford Machine Tool Co. For more information, check No.* 12 *on the attached postcard.*

Magnetic Chuck

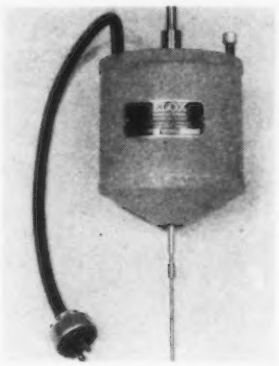
SUITED for use on small machines and for bench work, a new magnetic chuck is precision built and has a laminated face plate, as in larger Magna-Lock models. Work pieces are held to extreme edges of the face plate, which is said to provide 22 pct more magnetic area and uniformly distributed holding power. Hermeti-



Coil construction makes the chuck moisture-proof and impervious to coolants or cutting oils. This Model Hr-510-C has a 5 x 10 in. working surface and is 4 in. high. It is furnished with separate rectifier and built-in switch, and uses ac current. *Hanchett Magna-Lock Corp. For more information, check No.* 13 *on the attached postcard.*

Broken Tool Remover

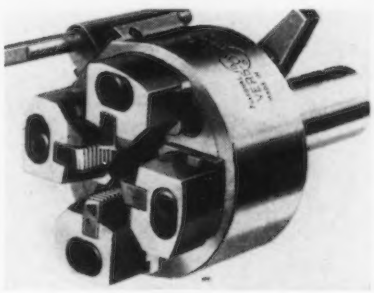
A LIGHTWEIGHT, portable disintegrator that can be set into a drill press, removes broken tools, studs, and pins. The Model X is designed to cover the needs of any shop where taps, drills, reamers, studs and pins in sizes from 0.085 in. upward require removing. The device does not anneal



the work; there is no distortion, electrolysis or mutilation of any kind and the hole-wall or thread is not touched or damaged in any way, it is claimed. The tool disintegrates by electrical erosion. *Elox Corp. For more information, check No.* 14 *on the attached postcard.*

Adjustable Blade Chaser

EACH unit, chaser, holder and slide on a new adjustable blade chaser is interchangeable with Vers-o-tool equipped circular chaser units normally used for long run production. These adjustable blade chasers used for limited production lots of both threading and hollow milling work on B & S single spindle automatics are designed to offer a wide threading range. The chaser is 1/4 in. thick and adjustable for wear. Chasers and holders for 3/8 and 9/16 in. B & S sizes are interchangeable. The 3/8-

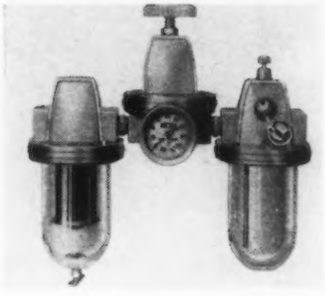


in. head has one slide for a cutting range from zero to 7/16 in.; the 9/16-in. head has two slides, zero to 7/16 in. and 29/64 to 11/16 in. To change to either size head, only the slides are replaced. Since the helix of the thread is on the chasers, the same slides may be used

for threading chasers or hollow milling cutters. *National Acme Co. For more information, check No.* 15 *on the attached postcard.*

Compressed Air Conditioner

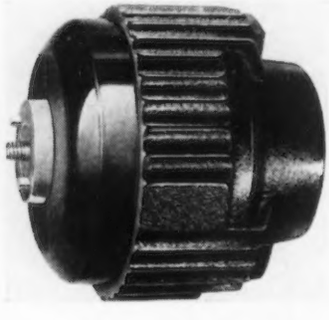
FOR conditioning compressed air prior to its use in tools, cylinders, and other air powered equip-



ment, an improved unit combines the new Air Warden filter, pressure regulator, and lubricator in a compact assembly that first cleans and purifies the air, automatically controls its pressure, and then adds atomized oil for the internal lubrication of moving parts in the air powered equipment. Weighing approximately 10 lb, the complete unit occupies only 12 in. of space in the air supply line. It is being offered in standard $\frac{3}{8}$ and $\frac{1}{2}$ in. sizes. *Hannifin Corp. For more information, check No.* 16 *on the attached postcard.*

Motors

A LINE of 4-pole, shaded pole, single-bearing motors in models up to 9 w output has been developed for refrigeration, air conditioning, heating, ventilating and other single-bearing motor applica-



tions. Designated as MonoMotors, their design features include a large oil reservoir isolated from heat and permanently sealed, plus an inorganic packing said to combine high oil holding capacity with the ability to release oil as required. Forced feed lubrication, a cone and slinger, oil catcher, and oil return ducts are included. The die-cast aluminum rotor is held to position in the field area by magnetic force to minimize end thrust. Stator windings are impregnated with humidity-resistant varnish. The cast iron case is finned to dissipate heat. *Redmond Co., Inc. For more information, check No.* 17 *on the attached postcard.*

Combustion Tubes

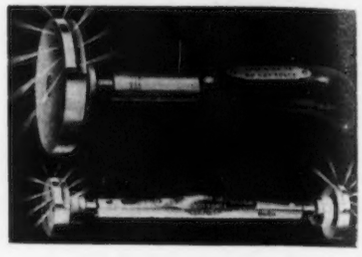
ZIRCOTUBE combustion tubes have been announced for application for carbon and sulfur determinations where combustion tubes must withstand greater temperatures and be gas-tight over a long period. Model No. 3326-17 is designed for rapid carbon determination. Liners increase tube life by completely protecting tube from splatter. A glass wool and sulfur trap entraps iron dust at the first low temperature zone to filter out all sulfur dioxide. No. 3127-17 is designed for sulfur determination by combustion. The liner also protects the tube from splatter and allows fast heat transfer for slow burning sulfur compounds. A ceramic filter traps dust at first medium high temperature, 1800°F; thus avoiding dust accumulation in the cooler portion of the tube which would pick up sulfur and cause error in the determination. *Harry W. Dietert Co. For more information, check No,* 18 *on the attached postcard.*

Torque Bar

A NEW heavy-duty torque bar features accuracy and ruggedness in torque ranges from 200 to 600 ft-lb. The bar is pre-set for specific torque requirements within its range. In operation, when the desired torque is reached there is a click and a small button in the handle taps the operator's hand, thus eliminating the need for visual attention. This lightweight Livermont Torq-Bar is available with or without detachable head or with special heads built to specifications. The standard head is a reversible $\frac{3}{4}$ in. square drive ratchet type that operates in either direction. *Richmont, Inc. For more information, check No.* 19 *on the attached postcard.*

Plug Gages

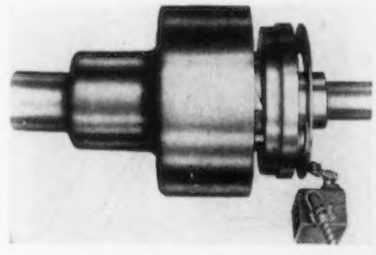
DUBO plug gages with hard caromium plating on the gaging surfaces are announced as long wearing because of their design. In contrast to cylindrical plug gages, these gages give indication by means other than whether or not they can be entered into a bore.



A DuBo member is entered with its spherical gaging surfaces out of range of the bore walls and following entry the gaging surfaces are rocked into contact, or potential contact, with the inside of the bore. Chrome plated as well as plain steel gages are available in all standard accuracy classifications including that as fine as XX. *Standard Gage Co. For more information, check No.* 20 *on the attached postcard.*

Torque Control Couplings

TRANSMISSION type torque control couplings that are fitted with an automatic tripper attachment act as an automatic clutch that releases the instant an overload occurs on the motor-driven equipment. The attachment trips a switch to permit the driving motor to coast to a stop. When an overload occurs, the output shaft

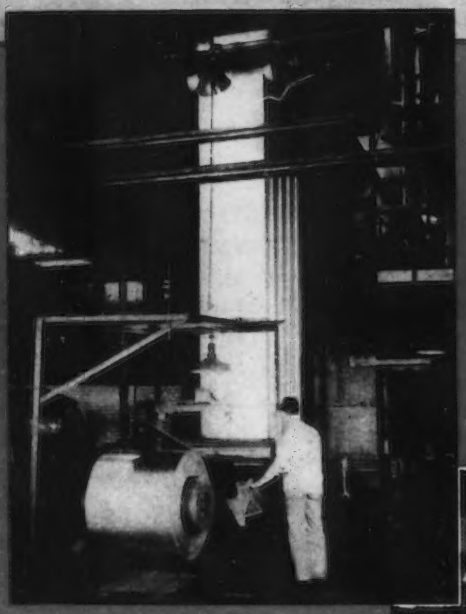


coupling makes only a fraction of a revolution before the dual cam operating ring actuates the roller arm of the limit switch, which instantaneously shuts off the power to the motor and the whole unit becomes stationary. After the overload is eliminated, it is ready for full-load operation without re-

Auxiliary Equipment and Machinery

Designed and Built by

MESTA

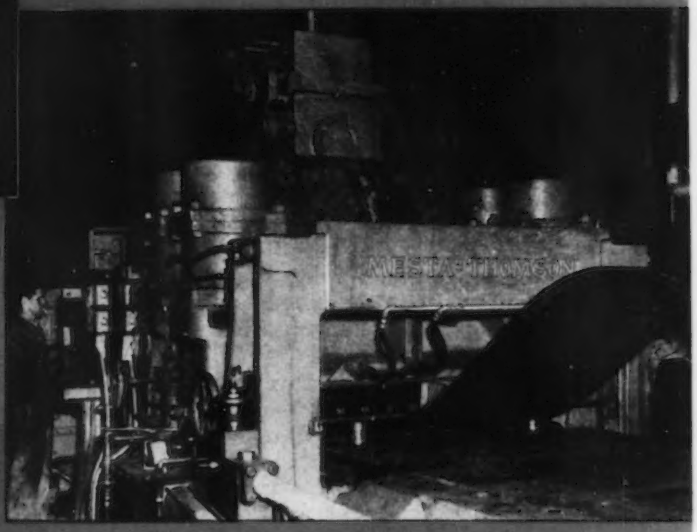


Discharge end of Mesta 42" Continuous Electrolytic Tin Plating Line

Battery of five 42" Mesta High-Speed Electrolytic Cleaning Lines

Group of Mesta 32" Patented Pickling Machines

Mesta 42" Tin Shearing Line, showing Mesta Patented Flying Shear and Leveller with Classifying and Piling Equipment



Mesta-Thomson Flash Welder Located at the Entry End of a Mesta Continuous Pickling Line

Designers and Builders of Complete Steel Plants

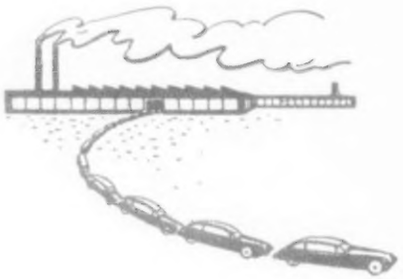
MESTA MACHINE COMPANY

PITTSBURGH, PA.

Assembly Line . . .

WALTER G. PATTON

• Chevrolet achieves important weight savings in its new 1949 models . . . Chrysler on-the-record showing for the press takes the industry by surprise.



DETROIT—From the standpoint of the steel supplier, the outstanding feature of the new Chevrolets being introduced at the Waldorf this week is the successful battle Chevrolet engineers have been waging against increased weight.

There is some decrease in weight due to a reduction of an inch in the wheelbase. Chevrolet engineers say that a sturdier body and the redistribution of weight permitted a slightly narrower frame. Using box girder construction, a reduction of 4 pct in frame weight has been accomplished.

Approximately 19 lb have been eliminated in the new front suspension assembly. The new cross member of the front suspension is an entirely new design. A semicircular cross-section is employed with a nearly flat cover plate. The center section curves forward to support the engine; the outer ends serve as front suspension mountings. Stiffness of this member has been increased 15 pct. Taking into consideration the entire suspension assembly the 1949 design is 12 pct lighter in weight than the 1948 suspension.

Additional weight savings have been accomplished with the new aeroplane-type shock absorber assemblies. In the seat cushions, a flat spring has been substituted for conventional coils.

In the new Chevrolet body, the underbody cross members are welded to the body sills and the floor panel is welded to this frame work. The floor serves both as a rear seat support and a rear seat foot rest. Reinforcements for the rear shock absorbers are welded both to the floor and the body sides and seat back gussets.

A larger and stiffer roof bow is located at the body center pillars. Chevrolet engineers say the new body has much greater resistance to twist than the previous model.

The instrument panel is welded into the body front-end structure, thereby improving strength and rigidity of the front end of the body in addition to accomplishing some weight savings.

In the new Chevrolet models the engine has been moved forward 4 in. on the frame. Horsepower is unchanged. A new fast-idle mechanism has been added to improve cold-starting characteristics. A new oil filler pipe is located on top and at the front of the valve rocker panel.

A new steerling linkage consists of an adjustable drag link connecting the Pitman arm to a third arm which is pivoted at the center of the front suspension cross member. Tie rods are of equal length. Offering greater symmetry of movement by both front wheels and tie rods, the new steering geometry has also been designed against road shocks.

Chevrolet has eliminated the vacuum booster on its gear shift. The starter button has been removed from the floor to the instrument panel. A ½ in. vent pipe at the top of the fuel tank taps back pressures when the car is being fueled. Wheels have broader rims and are 15 in. diam. Tires are 6.70-15 four-ply low pressure.

THE front tread is slightly narrower than the rear, having been reduced ⅝ in. to 57 in. Bodies are 2½ in. lower, having an overall height loaded of 63⅝ in. A new radiator design offers 8 pct more core area. Rear bumpers have been recessed into the body. Timing gears have forced lubrication instead of gravity feed. The rear bumpers are made of spring steel. The front bumpers are also spring steel rather than low carbon, high strength steel.

Buyers of the new Chevrolet will find a spring latch in the luggage compartment which holds the car jack firmly in place.

Chevrolet will offer two different lines of cars, the Fleetline and the Styleline. The Fleetline is characterized by the extension of the roof line in an unbroken sweep to the rear. The Styleline has the familiar "notch back."

The passenger compartment of the new Chevrolet cars has been lengthened, broadened and lowered. Toward the rear, the front fenders are absorbed into the body, but the suggestion of a rear fender has been continued as in other GM lines. Glass area has been increased 30 pct compared with the earlier models. It has been reported that Chevrolet plans to use bonded rather than riveted brake linings.

The steerling wheel is thinner and is positioned lower to afford more vision for the driver. Dials are grouped in a circular cluster on the face of the speedometer. The emergency brake is a straight pull lever mounted below the dash at the right of the steering column. Only slight pressure of the thumb is required to release it.

THE background behind Chrysler's unprecedented move in showing its 1949 cars "on-the-record" but without prices or pictures weeks ahead of dealer showings is as interesting as it is surprising.

Until last week's showing the details of Chrysler's new styling were one of the industry's best-guarded secrets. Even some of the members of Chrysler's top executive group didn't know until 2 weeks ago that an on-the-record preview would be held. Also, the timing of the move —just a few days ahead of GM's

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FAIRVIEW FOUNDRY COMPANY Poughkeepsie, N. Y.	66"	Gray iron castings from 1 to 400 lbs. each	Up to 1500 lbs.	4 min.	Airblast room and table and 3 tumbling mills	8 hour cleaning job reduced to 3 hrs.
IROQUOIS FOUNDRY CO. Racine, Wisconsin	72"	Gray iron jobbing castings	Up to 2500 lbs.	3 to 5 min.	Airblast room and 2 tumbling mills	Eliminated 4 men, cut cleaning time from 25 min. to 5 min.

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Waldorf extravaganza—was hardly a coincidence.

Consider this, too: despite the fact that the press and an army of advertising salesmen have crawled in and out of them for several hours, asked questions and actually driven the new cars, some of the most important things about the cars are still unknown. Fof example, the exact horsepower of the engines has not been disclosed. The compression ratio has been boosted to 7:1 *plus*. Finally, Chrysler's plans for an automatic transmission are still being withheld although an improved semiautomatic transmission is rumored to be a better bet than a torque converter type.

Looking back, if anybody's thunder has been stolen by K. T. Keller's unexpected move, the losers must be GM and the space peddlers who, as a group, are probably the most prolific purveyors of "inside stuff" in the industry. On this occasion, the space representatives probably saw a new car *in the open* for the first time in their long careers. And they saw the new cars at the same time as the press. Only this time, the press rather than the salesmen will bring the story to the public.

Any description of the Chrysler 1949 models should begin with the statement that the new cars represent the *least* radical departure from the preceding line of any of the postwar cars. Chrysler is the first—and the only producer—not to carry the front fender line to the rear of the car. Rather, the front fender line blends into the door, eliminating the pontoon effect.

IN every other respect, the new cars have the advantages of the new postwar styling. And Chrysler will probably be the only producer who won't be criticized for lack of head room, lack of leg room, difficulty getting in and out of the car and lack of seat height.

Overall height has been reduced from 1⅝ to 2¼ in. Outside widths have been contracted 1¾ to 3¾ in. The wheelbase is longer and the car has much less overhang in front. Windshield visibility is increased 24 to 37 pct. All glass areas are larger.

Weight of the cars has been increased but part of the weight increase is accounted for by the larger glass area. However, steel requirements will probably be a few pounds greater per car than the 1948 series.

In future months, you will undoubtedly hear much about the paradoxical aspects of the new Chrysler line. Overall length has been shortened at the same time leg room is increased. Outside height has been decreased but headroom is increased. Outside width is less but seats have been widened as much as 8 in.

Cars of the Chrysler line will have flat glass divided windshields. Slant of the windshield is much less than in several of its competitors cars. The cowl ventilator is retained. Heaters are much larger and of the fresh-air type. The Chrysler trademark of a brightly flashing stoplight is retained.

Radiator grilles are lower and slightly less ornate. Stainless steel with a chrome flash is used in the Dodge and Plymouth; DeSoto and Chrysler will use diecastings.

Bumpers are of comparatively simple design and are attached to extra heavy, double-pronged spring steel supports. The bumpers are low carbon steel. Bumper supports 1¾ in. x 5/16 in. are made of 0.90 C steel.

A trim line is carried along the bottom of the car and at the bottom of the windows. Last year's upper trim was at the door handle level. A stainless stone deflector is attached to the leading edge of the rear fender which is only partially absorbed into the body.

THE system for distributing warm air into the car has been redesigned to eliminate "front seat hot foot." Incidentally, an impregnated fiber board is employed to convey the warmed air from the heat exchanger into the front compartment.

Most talked-about new model is a 3-passenger Dodge roadster, the "Wayfarer." This model is built on a 115 in. wheelbase. There are no windows (although removable side windshields are furnished). Most of the fancy trim has been eliminated. Behind the back seat is a shelf where the kids can ride comfortably for a short distance. The shelf can be folded out of the way to provide additional luggage space.

K. T. Keller, president of Chrysler, said more than $90 million has been spent in designing and tooling for the new models. Still undetermined is the extent to which Chrysler will use the same set of dies for several lines of cars. Best bet is that at least two sets of basic body dies are used. In all probability, dies for the doors are common for most models. This latter practice is fairly common.

MOST POPULAR U. S. CAR: *Shown here is the new* 1949 *Chevrolet featuring the new postwar styling, including curved windshield, low center of gravity and advanced engineering. Most notable accomplishment of the Chevrolet stylists and engineers is weight saving in the frame, body, front suspension assembly, and shock absorber assembly. You can start an argument in Detroit anytime by referring to the new Chevvy as "a little Cadillac" but the resemblance in styling between the two cars is apparent.*

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UNITED STATES STEEL

Washington . . .

EUGENE J. HARDY

• Administration hedges on expansion issue . . . Steel capacity "experts" analyzed . . . Clamor for more capacity due to continue.

WASHINGTON — The only real surprise in the President's State of the Union message was his recommendation that upon a finding of inadequacy of steel and other industrial capacity, the government should be empowered to lend money to build additional facilities and if such loans were refused the government build such facilities with the taxpayers money. That such views have been held by prominent individuals for a good many years is no secret, but it was surprising to find that this first step toward nationalization of industry had been sold to Mr. Truman.

Who did the selling is the $64 question. Certainly, it was not the Dept. of Commerce or the Council of Economic Advisers, the two bodies set up to advise the President on economic matters. In fact, the annual economic report of the council to the President contained no reference to this controversial recommendation, as the President indicated would be the case when he addressed the Congress. Privately, the Commerce Dept. is also adopting a hands-off policy.

Nevertheless, it did find its way into the Presidential message. However, in all fairness it should be pointed out that Mr. Truman has already hedged on this point, having stated that government construction of new steel facilities would come only as a last resort. Perhaps he has become aware of the steel industry's record-breaking output last year and the possibility of even greater output this year. The President must also realize that his demands for new corporate taxes, broad economic controls and repeal of the Taft-Hartley Act are not conducive to private investment in new facilities.

WHILE it may never be publicly revealed as to who sold this socialist hocus-pocus to the President, there are many individuals in Washington, on the public payroll and elected representatives of the people, whose one burning ambition is to make-over the steel industry. There can be little doubt that these individuals have had considerable influence in this matter and have garnered some labor support.

In the Congress, the two leading exponents of the "make-over" industry school are Senators James E. Murray and Joseph C. O'Mahoney, both Democrats from the great steel-producing states of Montana and Wyoming, respectively. Oddly enough, however, these two have stayed out of the limelight regarding the President's recent proposals. Senator O'Mahoney who, during the past year soundly blasted the steel industry at hearing after hearing, contented himself with issuing a statement which said in part, "surely no one can quarrel with the President's proposal for the expansion of capacity to produce basic commodities. . . ."

The Wyoming Senator did not join in sponsoring the legislation which Senator Murray introduced as a joint measure with Senator Sparkman, D., Ala., and Representative Patman, D., Texas, who threw it into the hopper in the House. This is the bill which would authorize the lending of $15 billion by the RFC for construction of new productive facilities. The steel industry is not mentioned specifically.

Senator Murray, lawyer, rancher, miner, property owner, and one-time chairman of Montana's PWA advisory board, has lambasted the steel industry again and again while serving as chairman of the Senate Small Business Committee. A more recent convert to the "let's make-over steel" school, he is nonetheless effective in committee hearings.

SENATOR O'Mahoney, lawyer, newspaperman, and politician, now chairman of the Joint Economic Committee, has had his scalping knife out for the steel industry since the days of the Temporary National Economic Committee. When he served as chairman of this group it was considered great sport to belabor the steel industry for having too much capacity. Now the pendulum has swung in the other direction.

But it would seem quite obvious that the people of the states of Montana and Wyoming, where there is no basic steel producing industry and only negligible consumption of steel, did not elect their senators to spend a good portion of their time in Washington trying to make over the steel industry, increase its capacity, allocate its products, etc. It is, therefore, equally obvious that these men cannot spend much of their time on this problem and that someone else is doing their thinking on steel. This is particularly true in the case of Senator Murray.

A look at these thinkers is even more enlightening, and provides an interesting sidelight as to how an infinitesimal portion of the taxpayers money is spent. The first of these men meriting attention is Dewey Anderson, relief worker, professor, government employee, and self-designated expert on steel. He first began showing interest in the steel industry during the halcyon days of the TNEC, and when ap-

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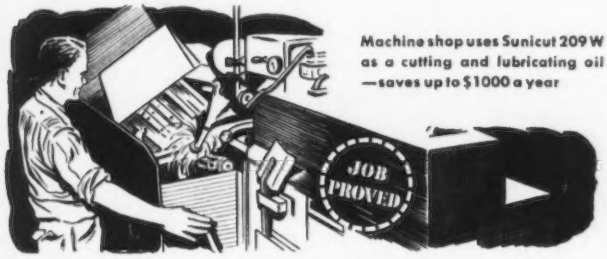

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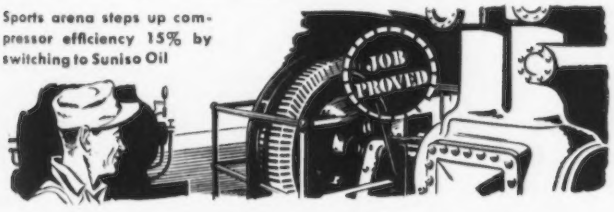

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CIRCOSOL-2XH—An elasticator and processing aid for natural rubber and especially for GR-S. Outstanding for sponge rubber.

CIRCO LIGHT PROCESS AID—A processing agent and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber. Used for GR-S to some extent.

SUNDEX-54—An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established processing aid for rubber footwear stocks and semihard rubbers.

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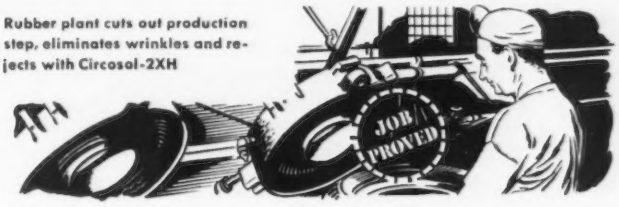

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pointed to the staff of the Senate Small Business Committee by Senator Murray some years ago the steel capacity argument began creeping into the Committee's reports.

WHEN the Republicans took control of the 80th Congress, Mr. Anderson was out of a job and set up the Public Affairs Institute, a labor-backed economic organization. But even though his congressional employment had ceased officially, Who's Who still carried his address as the Senate Office Bldg.

Prior to the adjournment of the 80th Congress last year, he had prepared a minority report to the Senate Small Business Committee report on steel and a steel expansion bill for Senator Murray both of which on rereading sound suspiciously like the exact recommendations made by the President 2 weeks ago. Senator Murray did not introduce the bill at that time.

It is reasonably certain that Mr. Anderson will again direct Senator Murray's thinking on steel matters during the 81st Congress. Shortly after the November elections he spent a great deal of time discussing this matter with various government officials attempting to win them over to the "government-in-the-steel-business" way of thinking. He was partially successful.

ANOTHER individual whose planted thinking on steel has been espoused by Senator Murray is a man who has spent most of his working life wrestling with agricultural problems, Louis H. Bean. From 1923 to 1941, he labored in one or another of the government's many agricultural agencies. During the war, he served with Henry Wallace's Board of Economic Warfare, then moved to the Budget Bureau and is now a special assistant in the Office of the Secretary of Agriculture.

It is rumored that some day some one is going to tell the Secretary of Agriculture that the problems of the steel industry are rightfully, as a matter of law, within the province of the Dept. of Commerce. Mr. Bean, more outspoken in recent years than has been Mr. Anderson on the matter of steel capacity, has prepared several studies for Senator Murray which have been well publicized in THE IRON AGE (Aug. 5, 1948, p. 104).

In still another department of government and on the junior cabinet level is one Crow Girard Davidson, Assistant Secretary of the Interior. Mr. Davidson is a recent convert to the "more-steel-capacity" school, but a very effective one. During the past year, he swallowed the Anderson-Bean arguments hook-line-and-sinker and called for an additional 10 million tons of capacity to be built by government, if industry wouldn't go along with the idea. Oh, yes, his qualifications as an expert on steel—attorney with TVA, U. S. Housing Authority, Bonneville Power Administration, private practice and a short stint at teaching, and, during the war he served with OPM and WPB.

THERE are others in public life who would also like to make-over the steel industry, but this quintet is probably the most important group. Regardless of who finally sold the idea to the President, it's a pretty safe bet that some of these experts were close at hand.

The question might well be asked—"Don't they know that the steel industry broke all records last year and will probably repeat again this year and might well bring supply and demand in balance?"

Further, don't they know that, according to the Dept. of Commerce, a 10 million ton expansion job, to be undertaken as a completely new unit, would cost somewhere in the neighborhood of $4 billion and require 10,900,000 tons of iron ore, 7,070,000 tons of coke, and 6,890,000 tons of pig iron?

Yes, there is no doubt that they are aware of these and many other factors which would certainly cool the ardor of ordinary men. But, their minds are made up. The steel industry must be made over. It's present managers don't know how to run their business, so let the experts do it.

Even if steel is running out of the nation's ears before too long, these men will not be quieted. In fact, THE IRON AGE already has evidence that in preparation for any such eventuality arguments are being mustered to support steel expansion as a national defense measure.

P. S. They are all nice guys and very much in favor of free enterprise.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

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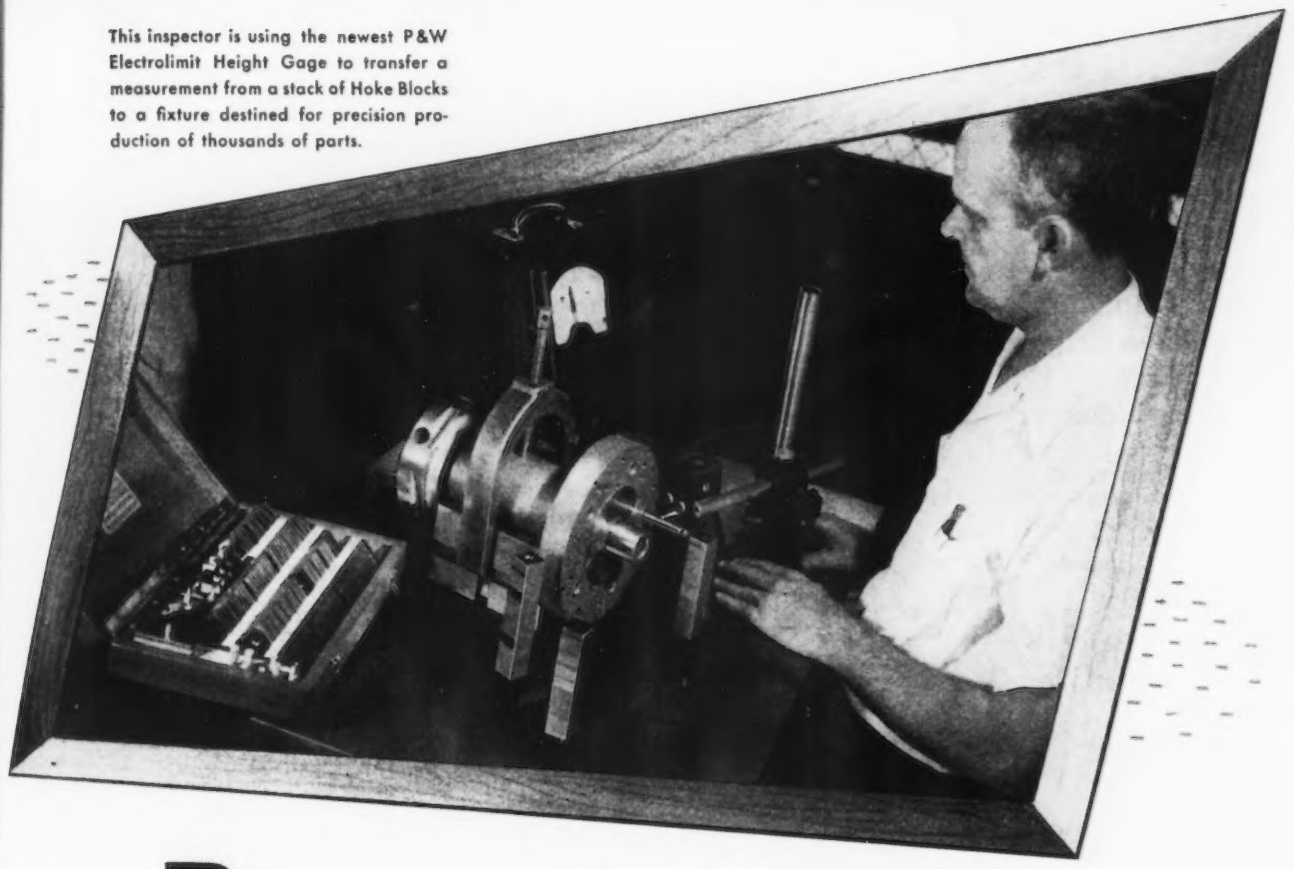

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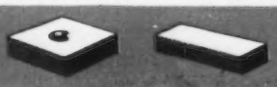

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West Coast . . .

ROBERT T. REINHARDT

• Freight rates that determine diameter of marketing areas for steel producers offer food for thought . . . Ford still seeking western suppliers . . . Cold spell affects industry.

SAN FRANCISCO—That drawstring limiting the market territory for steel producers under the f.o.b. price system was drawn just a little tighter with the emergency freight rate increase effective Jan. 11.

In the far West only California steel buyers gained a little respite as the California Public Utilities Commission has not approved the increase applied for by the railroads and until after hearings to be held here Feb. 7 at least, steel is moving on the railroads within the state without the added 4 pct effective elsewhere. The only exception to this present situation is that shipments being made within the state for export are subject to the 4 pct addition.

There is considerable evidence that shippers of all commodities in the state will strenuously oppose the application of the railroads for this increase and are prepared to show that western roads have fared much better financially than those in the east and that an increase in rates is not justified now. At hearings recently held at the Pacific Freight Traffic Bureau threats of large-scale switches to truck hauls were made by important shippers backed up by the California Manufacturers' Assn.

The San Francisco Bay Area Council recently made a study of the operations of western railroads since the end of the war and among other things points out that: "Western roads have made substantially better progress toward reducing fixed charges than have eastern roads. Between 1940 and 1947, western roads reduced fixed and contingent charges by one third, while eastern roads achieved only a 15 pct reduction during this same period. The actual annual savings were $88 million in the West and $40 million in the East. The gain in traffic since before the war has undoubtedly helped western railroads achieve their record. Combined revenue traffic on western lines more than doubled between 1940 and 1947; while on the eastern lines the gain was about 50 pct."

This study further revealed, "In 1940 carriers in the eastern district earned almost one half of the net income of all railroads and carriers in the western district accounted for about 5 pct of the industry total. In 1947 the eastern lines' share fell below one fifth of the total, while over one half of the total was earned by the western lines."

Regardless of whether steel users in the West will be asked to pay a still higher freight rate, the fact remains that freight rates will govern to a large extent the marketing territories of each western producer as it does elsewhere under present pricing methods and the accompanying table of approximate present freight rates between producing and marketing

Freight Rates Which May Determine Marketing Areas Of Western Steel Products*

(Cwt = 100 lb)

FROM ▼ TO→	SAN FRANCISCO	LOS ANGELES	PORTLAND	SEATTLE	SPOKANE
Fontana, Calif.	0.31 cwt $ 6.20 net ton	0.08 cwt $1.60 net ton	0.852 cwt $17.04 net ton	0.926 cwt $18.52 net ton	1.26 cwt $25.20 net ton
Geneva, Utah	0.603 cwt $12.06 net ton†	0.603 cwt $12.06 net ton	0.603 cwt $12.06 net ton	0.68 cwt $13.60 net ton	0.603 cwt $12.06 net ton
Niles, Calif.	0.08 cwt $1.60 net ton	0.31 cwt $6.20 net ton	0.55 cwt $11.00 net ton	0.62 cwt $12.40 net ton	1.248 cwt $24.96 net ton
Pittsburg, Calif.	0.08 cwt $1.60 net ton	0.31 cwt $6.20 net ton	0.55 cwt $11.00 net ton	0.62 cwt $12.40 net ton	1.248 cwt $24.96 net ton
Portland, Oregon	0.55 cwt $11.00 net ton	0.85 cwt $17.00 net ton		0.21 cwt $4.20 net ton	0.697 cwt $13.94 net ton
Seattle, Wash.	0.62 cwt $12.00 net ton	0.926 cwt $18.52 net ton	0.21 cwt $4.20 net ton		0.697 cwt $13.94 net ton
South San Francisco	0.07 cwt $1.40 net ton	0.31 cwt $6.20 net ton	0.55 cwt $11.00 net ton	0.62 cwt $12.40 net ton	1.248 cwt $24.96 net ton
Torrance, Calif.	0.31 cwt $6.20 net ton	0.0475 cwt $0.95 net ton	0.852 cwt $17.04 net ton	0.926 cwt $18.52 net ton	1.26 cwt $25.20 net ton
Rates from Other Points (for comparison)					
Chicago					1.428 cwt $28.56 net ton
Duluth					1.313 cwt $26.26 net ton
Minnequa, Colo.					1.154 cwt $23.08 net ton
Sparrows Point, Md. (1)	0.8729 cwt $17.46 net ton fob cars at dock	0.9192 cwt $18.38 net ton plant delivered	0.84765 cwt $16.95 net ton fob car at dock	0.84765 cwt $16.95 net ton fob at dock	1.53 cwt $30.60 net ton

* 3 pct tax not included in rail freight rates.

† This rate applies to finished steel. On Jan. 3, 1949, Western Pacific, Denver & Rio Grande and Sacramento Northern railroads published a rate of $9.16 per gross ton (approximately $8.18 per net ton) to cover hot-rolled coils shipped from Geneva to Pittsburgh, Calif.

(1) These rates do not reflect the Jan. 11 "emergency" increases which include 5 pct on the basic .73 cwt and minor other increases on incidental charges. The rail portion of the Spokane rate is also subject to the 4 pct increase.

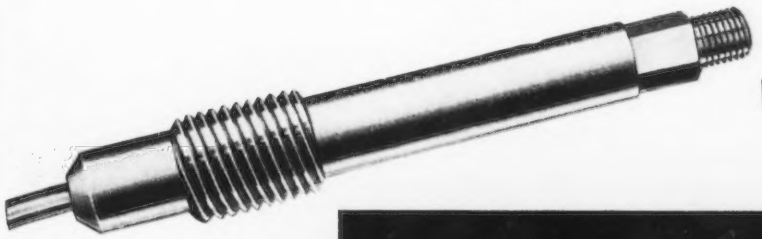
When You Want to Get
LOWER UNIT COSTS WITH STAINLESS

—Use These 3 Helps *Carpenter* Can Give You!

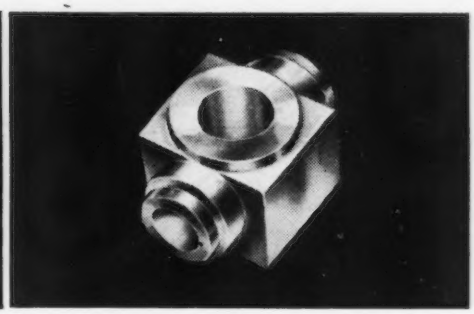
1 MORE OUTPUT PER SHIFT means a lower cost on every Stainless unit you produce. To find new ways to boost output and reduce rejects, use the Carpenter "Notebook on Machining Stainless Steels." It contains over 90 pages of useful shop hints on Turning, Drilling, Reaming, Threading, etc. Make full use of this Carpenter service to Stainless users by writing a note on your company letterhead and indicating your title. We will rush your copy of the NOTEBOOK. Extra copies are available at 50¢ each for the men in your plant.

2 YOU CAN SIMPLIFY YOUR OPERATING PROBLEMS by making use of the complete Free-Machining bar stock inventory carried by your Carpenter warehouse. You can reduce machine down-time, get into production faster, when you order standard sizes from Carpenter. To figure your own savings in doing business this way, call the nearest Carpenter warehouse listed below.

3 SAVE MONEY ON NEW JOBS by using Carpenter's experience and know-how to reduce the cost of tooling and find shortcuts in production. Ever since the first Free-Machining Stainless bars were invented in Carpenter's laboratory, we have been helping to cut the cost of machining Stainless. When you can use that kind of help, just get in touch with your Carpenter representative.



LOWER UNIT COST—Units cost less to service after they leave your plant when they are made from Stainless. The manufacturer who uses Carpenter Free-Machining Stainless No. 5 (Type 416) for this heavy duty valve part tells customers to "install the valves and forget 'em".



You Can Turn It Out AT LESS COST with Carpenter Free-Machining Stainless!

REJECT PROBLEM SOLVED! Total tolerance of .0001" is held on roundness of the ball, and .0001" concentricity on full length of the thread. The problem of rejected instrument parts has been completely solved . . . with Carpenter Stainless No. 8 (Type 303).

TOLERANCE IS ±.0001"—On this part containing only 1¢ worth of steel, adding the cost of machining makes each part worth $8. As the manufacturer puts it: "Experience with other materials has convinced us that we get less rejects and better machining time with Carpenter Free-Machining Stainless."

THE CARPENTER STEEL COMPANY, 121 W. BERN STREET, READING, PA.

Carpenter

FREE-MACHINING

STAINLESS STEELS

When You Want *Rush* Delivery Call Your *Carpenter* Warehouse—

more than corrosion resistance

BOSTON	CINCINNATI	HARTFORD	PHILADELPHIA
BRIDGEPORT, CONN.	CLEVELAND	INDIANAPOLIS	PROVIDENCE
BUFFALO	DAYTON	LOS ANGELES	ST. LOUIS
CHICAGO	DETROIT	NEW YORK	WORCESTER, MASS.

SEE THE CLASSIFIED SECTION OF YOUR TELEPHONE DIRECTORY

areas of the West affords opportunity for estimating each producer's participation in the principal consuming points.

FOR example, Kaiser Co. can reach the Los Angeles market with plates and structural sheets for $1.60 per ton, whereas Geneva, Utah customers would have to pay $12.06 per ton there. Of course in this particular instance the consumer can't realize the full effect of this freight savings since Kaiser's prices are substantially higher than are Geneva's. Kaiser's price f.o.b. Fontana for structurals is $115 per ton, whereas Geneva's price at the Utah plant is only $65 per ton. It is obvious that in this particular product Geneva's freight disadvantage at the present time is of little consequence.

It is granted that the full effect of these freight rates will not be felt in determining market territories until the competitive situation returns. However, with a softening of the market for several products such as bars and shapes here on the Coast, that day may come sooner than anyone heretofore anticipated. Buyers of these two items are already price-conscious.

•

Power Outlook is Bleak

Seattle

• • • **Weather made** industrial news here this past week as below-freezing temperatures made the electric power picture look very bleak.

Earlier in the winter, industry was facing curtailment of its use of power, and housewives were requested not to use electrical appliances any more than necessary between the hours of 4:30 and 6:30 p. m. The cold wave, however, blackened the already gray picture as rivers froze over and water wasn't available to turn the generators at capacity.

Bonneville Power Administration reports that the Columbia River at Grand Coulee Dam is furnishing 40,000 cu ft of water a second as compared to 69,000 cu ft a year ago. At Bonneville Dam the rate is down to 87,000 cu ft a second, from 95,000 a week ago and 210,000 a year ago.

Due to lack of water and to the failure of a few steam generators, the Northwest power pool has lost 42,000 kw during the past week.

At Spokane the Permanente Metals Corp. has had workmen standing by to shut down part of the production lines of its aluminum plant in the event notification is received that the power pool is near a crisis. The plants will voluntarily release part of their power, according to BPA authorities, whenever the administration states it can use that help.

Lake City, a settlement north of Seattle, is shutting off its sixty-five 500-watt street lights for the duration of the power shortage. In Seattle many merchants are turning their electric signs off to help save power.

•

Ford Hopes to Double Purchase of Parts in The West Coast Area

Los Angeles

• • • **Already spending** $50 million annually for parts on the West Coast, the Ford Motor Co. hopes to raise its purchasing total in this section to $90 million, Stanley W. Ostrander, Lincoln-Mercury operations manager, commented while making his first inspection of facilities at the Los Angeles assembly plant.

Mr. Ostrander said that Ford now has 43 firms manufacturing 370 parts used in assembling Lincoln, Mercury and Ford cars here. "The company would buy as many as 2600 different parts on the West Coast if suppliers could be found," the operations manager added.

Forecasting that prices are likely to advance slightly rather than decline in the automotive field, Mr. Ostrander pointed to increasing costs of labor, material and overhead items. The prediction is the reverse of that generally held in the automotive industry a year ago, he said.

J. E. Bayne, general sales manager for Lincoln-Mercury, predicted that the West Coast would remain a high demand market for automobiles for some time despite a softening of demand in some areas.

Ford recently announced that 40,697 units were assembled at the company's Long Beach plant—13,072 truck and commercial units and 27,625 passenger cars. The Maywood Lincoln-Mercury plant, opened in May, 1948, produced 2916 Lincoln and 17,410 Mercurys.

•

Natural Gas Shortage Due to the Cold Wave Shuts Down Operations

San Diego

• • • **Natural gas shortages,** which threaten almost every time there is a severe cold wave in San Diego, forced Rohr Aircraft to shut down operations for a day during the storm which brought a blanket of snow to southern California and some of the most "unusual" weather in history to San Diego.

The 3699 workers were back on the job as the pressure on the San Diego Gas and Electric Co. was relieved with the return of sunshine a day later.

An almost simultaneous short layoff for Consolidated-Vultee because of a temporary power failure may be the forerunner of another of longer duration for some of the assembly line workers at the company. Probability of an interval between work on the last few models of the two-engine large passenger planes now being pushed and on new contracts for the plane appears certain. Two or three deals for additional contracts on the revolutionary plane, which reverses its propellers on the ground, have been rumored. Convair also is doing work at San Diego on a Navy flying boat and on a sub contract for Boeing and other experimental jobs.

The smaller Ryan Aircraft Co., across Lindberg Field, has announced receiving two new contracts for planes and assemblies.

One calls for a $1,500,000 in the company's current order from Boeing for C-97 assemblies and practically doubles the original Ryan contract. It stems from an Air Force decision to increase by 23 the number of Boeing Stratofreighters which can be used in the Berlin airlift, according to T. Clayde Ryan, company president.

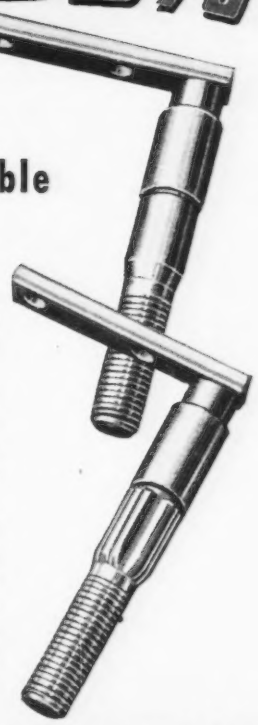
Ryan will build the 14-ft-diam rear fuselage sections and all floor beams.

The second contract calls for five more Ryan Navion L-17B liaison planes in addition to the 158 now nearing completion there. The planes will be used for both National Guard and Air Force work.

PRODUCTION UP 300%

Broaching Splines on Auto Window Cranks

Using MULTIPRESS* with Index Table

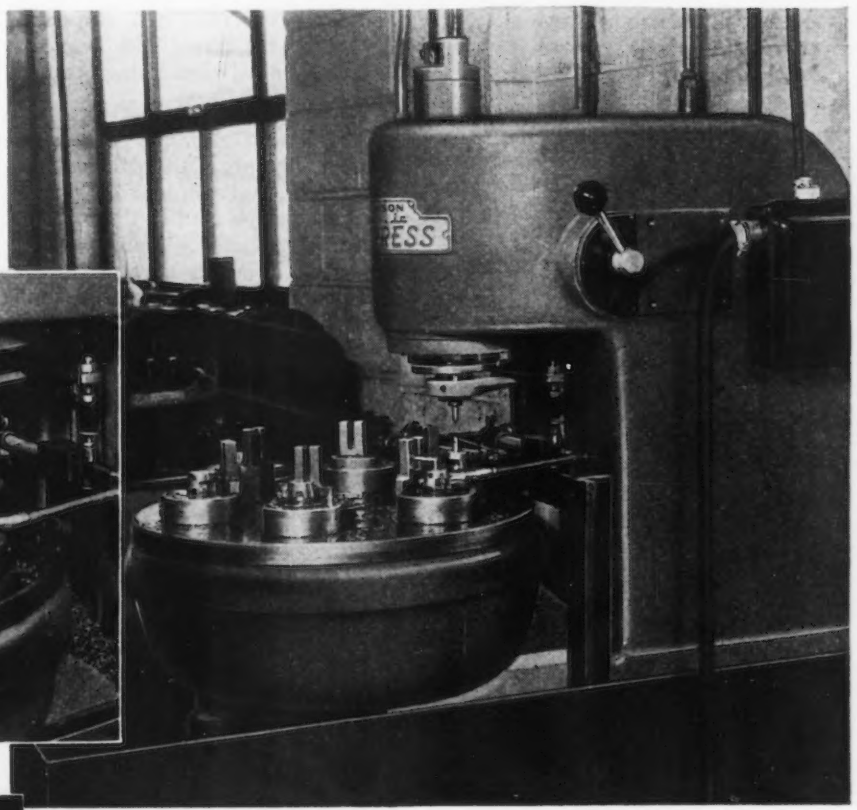


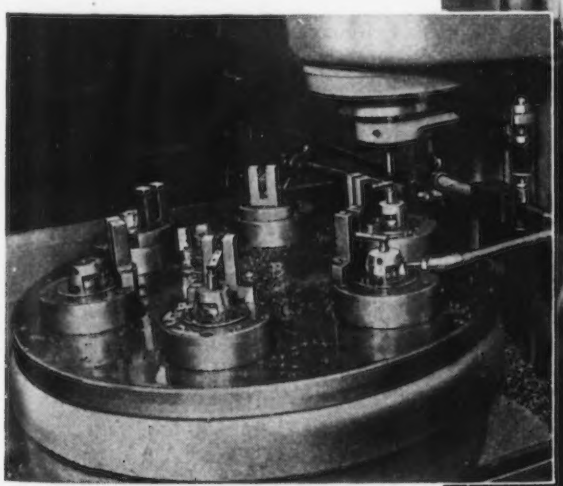
● Production jumped from 500 to 1500 parts per hour when a 6-ton MULTIPRESS and its Denison HydrOILic Index Table were recently installed at The Pivot Manufacturing Company of Detroit, Michigan. The job consists of broaching ⅝-inch splines on shafts used to regulate quarter windows of automobiles.

The operator simply places the shafts in the fixtures of the six-station MULTIPRESS Index Table as they pass the loading station. The parts are then indexed automatically to the ram station, where the press ram forces the shaft through the broaching tool. At the station just beyond the ram, the finished parts are pushed up from the broaching die by a cam within the index table housing, while an air-blast cleans the broaching die and the part.

This MULTIPRESS equipment reduced the operator's work to an easy loading-and-unloading operation. Its uniform oil-hydraulic pressure greatly reduced reject losses, which had been excessive. Also, by ejecting the broached shafts back out of the die, instead of pushing them on through as before, MULTIPRESS makes it possible to weld the cross members to the shafts before broaching. This ended the previous distortion of finished shafts during welding of cross members.

MULTIPRESS *offers quiet, oil-smooth accuracy of power in 1, 4, 6, 8, and 25-ton capacities, with manual and automatic controls for almost any type of ram action. The HydrOILic Index Table is only one of many standard* MULTIPRESS *attachments, tooling accessories and automatic feed devices that adapt the basic* MULTIPRESS *to hundreds of needs. Scores of case-history reports on various applications similar to this one are on file—your production may be improved the* MULTIPRESS *way, too. Write for details.*





* REG. U. S. PAT. OFF.

DENISON EQUIPMENT for APPLIED HydrOILics

The DENISON Engineering Co., 1158 Dublin Road, Columbus 16, Ohio

PERSONALS

M. J. L. SCHULTE, general sales manager, Stow Mfg. Co.

• **M. J. L. Schulte** has been appointed general sales manager of Stow Mfg. Co., Binghamton, N. Y. Mr. Schulte had been employed in a sales and administrative capacity at the Keystone Bolt & Nut Corp., New York, previous to his appointment at Stow.

• **Raymond E. Tibbetts** has been appointed division superintendent of the spring mill and rail bond division of the South Works in Worcester, American Steel & Wire Co., a U. S. Steel subsidiary, succeeding **Harry J. Clarke** who has resigned. Mr. Tibbett joined the Wire Company in 1911 and since 1940 has served as customer contact representative of that division. **Harold J. Elmendorf** has been named chief spring engineer of the division at the South Works. Mr. Elmendorf joined the U. S. Steel Corp. in 1937. He was transferred to the Wire Co. as research metallurgist in 1938 and since early in 1948 has been division metallurgist at the spring mill. **Erick R. Karlson** has been made division supervisor, production planning, of that division at the South Works. He joined the company in 1933 at the North Works, and since 1946 has been planning engineer. **Edmund J. Walsh,** who has served as Boston office manager for the company, has been appointed assistant manager of sales there.

• **Gordon P. Molsen** has been appointed sales manager of the Chuck and Machine Tool Div., Whiton Machine Co., New London, Conn.

o o o

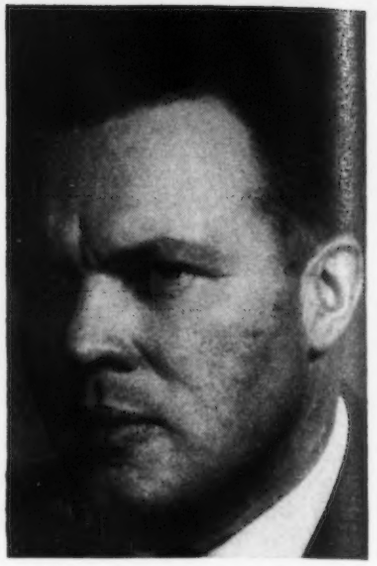
• **Ernest G. Unrath** has been named general superintendent of the Ambridge plant of the Spang-Chalfant division of the National Supply Co., Pittsburgh, succeeding H. J. Litsey, who died. Mr. Unrath joined the Spang-Chalfant organization in 1931 in the engineering department and was later transferred to the research department. He entered the Hot Mill in 1940 and was made superintendent of that department in 1945, which position he held until his new appointment. **Stephen W. Girgosh,** who has spent 31 years with the Spang-Chalfant organization, has been promoted from turn foreman in the Hot Mill to succeed Mr. Unrath.

• **C. S. Macnair** has joined Acme Steel Co., Chicago, as consultant on product development. Mr. Macnair has been operating his own package engineering business since 1926. **Robert M. Snodell** has been appointed assistant advertising manager for Acme. Mr. Snodell has been associated with the company since 1934 and has been in the advertising department since 1945.

• **Gilbert G. Galambus** has been named superintendent of the roll department, Indiana Harbor plant, Youngstown Sheet & Tube Co., Youngstown. Mr. Galambus has been with the company since 1929. He formerly served as assistant superintendent. **Robert E. Mauger** has been appointed assistant superintendent of the pipe mill of that plant. Mr. Mauger joined the company in 1921 and in 1926 was made electrical division foreman for the tube and skelp mills.

• **Frank J. Whelan,** vice-president, Worthington Pump & Machinery Corp., Harrison, has been named to head the corporation's welding machinery sales at the Dunellen works, with headquarters at the executive offices in Harrison, N. J.

• **Norman C. Rendleman,** has been added to the staff of the United Engineering & Foundry Co., Pittsburgh, as a special consultant. Mr. Rendleman brings to United Engineering over 40 years of experience with the Jones & Laughlin Steel Corp.



ROBERT G. ALLEN, vice-president, Great Lakes Carbon Corp.

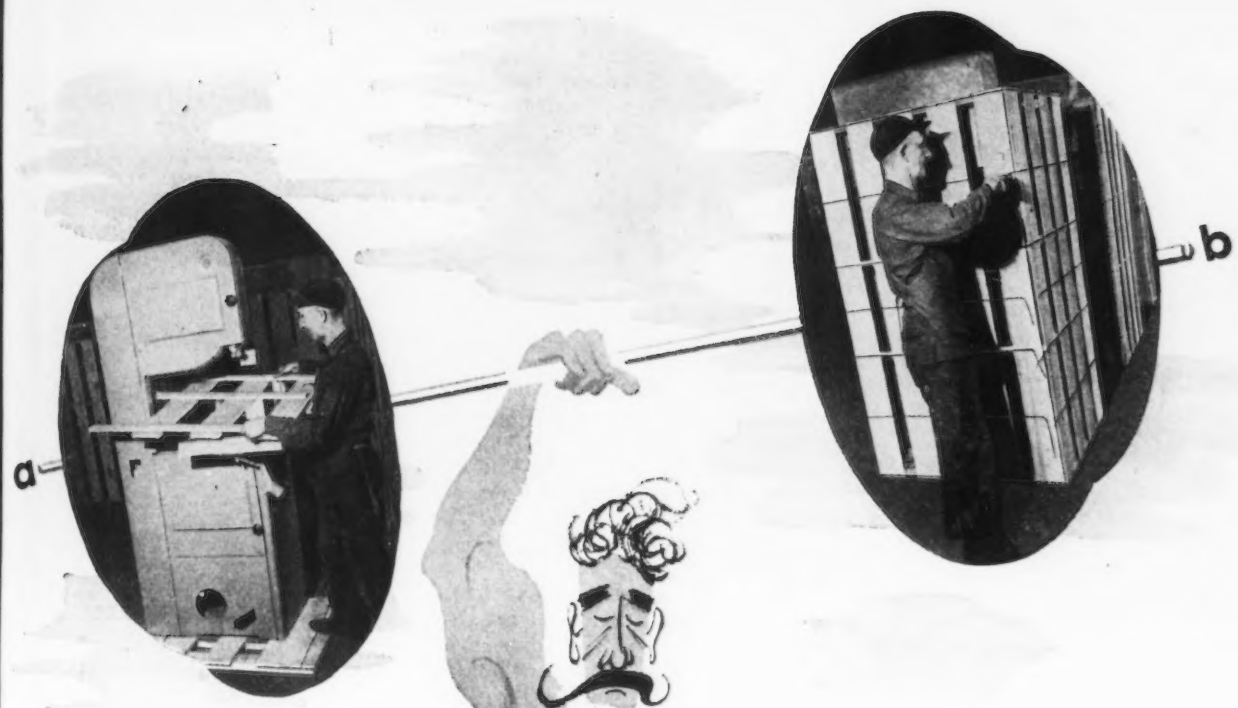
• **Robert G. Allen** has been elected vice-president in charge of the Electrode Div., Great Lakes Carbon Corp., New York, with his headquarters at the Niagara Falls plant. Mr. Allen had formerly served as manager of the division.

• **E. L. Klingler** has been named to direct the sale of Wickwire rope in the mid-continent area comprising Houston and Abilene in Texas and in Tulsa, Okla., for the Wickwire Spencer Steel division of the Colorado Fuel & Iron Corp.

• **Frederick G. Wacker, Jr.,** has been elected president and **Charles H. Wacker, III,** executive vice-president of Ammco Tools, Inc., North Chicago, Ill.

• **George O. With** has been appointed assistant vice-president, U. S. Steel Supply Co., Chicago, and has been succeeded as Chicago district manager of construction sales, Carnegie-Illinois Steel Corp., Chicago, by **Dwight L. Merrell,** who formerly served as his assistant. **Paul C. Van Cleave** has been named district manager of the Los Angeles warehouse of the U. S. Steel Supply Co. and **Frank B. Stewart** has been appointed district manager of the San Francisco warehouse.

• **O. T. Albaugh** has been appointed superintendent of the transportation department of the Midland Works, Crucible Steel Co. of America, Pittsburgh. Mr. Albaugh had formerly served as assistant trainmaster and yardmaster at the Pennsylvania R. R. station in Pittsburgh.



7 FT., 630 LB. GIANT BAND SAWS SHIP AT LOWER COST IN

WIREBOUNDS

265 pound crates previously required to pack the 20-inch bandsaws manufactured by the Crescent Machine Division of the Rockwell Manufacturing Company made shipping costly from both weight and space viewpoints. Then Wirebounds came on the scene to solve both problems.

Wirebound engineers designed a special four-piece Wirebound crate that weighed only 128 pounds and permitted loading four extra units in a freight car. The Wirebound crate afforded even greater shipping protection to minimize damage in transit.

The result . . . a 14% saving in over all shipping weight! And more, substantial reductions in actual packaging costs! Mail the coupon below . . . see how you can save with Wirebounds!

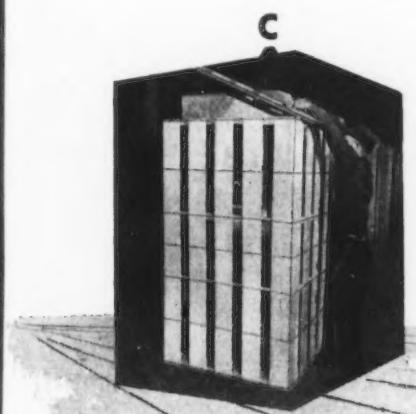


PHOTO a
Special interior packing fits snugly into place, provides added strength and protection.

PHOTO b
The Wirebound "mat" is wrapped around and closed, in this case by twisting wire ends.

PHOTO c
As a final operation the lid drops into position and is secured in a few moments.

Wirebound BOXES & CRATES

SIXTY WIREBOUND PLANTS THROUGHOUT THE UNITED STATES

WIREBOUND BOX MFG. ASS'N.
Room 1831, Borland Building, Chicago, Illinois

☐ SEND COMPLETE LITERATURE ☐ SEND A SALES ENGINEER

NAME POSITION

FIRM NAME

ADDRESS ZONE STATE

CITY PRODUCT

L. LEE EMERSON, manager of rolled steel sales, Iron & Steel Div., Kaiser Co., Inc.

• **C. Lee Emerson** has been appointed to the newly-created position of manager of rolled steel sales for the Iron & Steel Div., Kaiser Co., Inc., Oakland, Calif. Prior to this promotion, Mr. Emerson served as assistant district sales manager for the southern California area. **Rand Hogan** has been made assistant district sales manager for northern California and is in temporary charge of the northern California district sales office during the absence of Norman Balaam who has been loaned to Kaiser Fleetwings for an indefinite period.

• **A. Oram Fulton** has been elected chairman of the board of directors and executive officer, Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. **Frederick H. Lovejoy,** who has been executive vice-president for many years, has been elected president, succeeding Mr. Fulton in that office.

• **Jackson Turner** has been appointed assistant director of public relations for the New England district of United States Steel Corp. Previous to his new appointment, Mr. Turner had been associated with United Shoe Machinery Corp.

• **Albert R. Ford,** general manager of the Frost Gear & Forge Div., Clark Equipment Co., Jackson, Mich., retired recently after serving the company since 1909.

• **Joseph D. Linehan** has been elected a member of the board of directors of Binks Mfg. Co., Chicago.

• **J. T. Jones** has joined the sales force of Vesuvius Crucible Co., Pittsburgh. Mr. Jones had previously served with the openhearth department of Republic Steel Corp. at South Chicago.

• **Robert B. Barnes** has been appointed sales manager of the Link-Belt Speeder Corp., Chicago, succeeding **Hays W. Parsons,** who has retired. Mr. Barnes has been assistant sales manager for the company for the past four years.

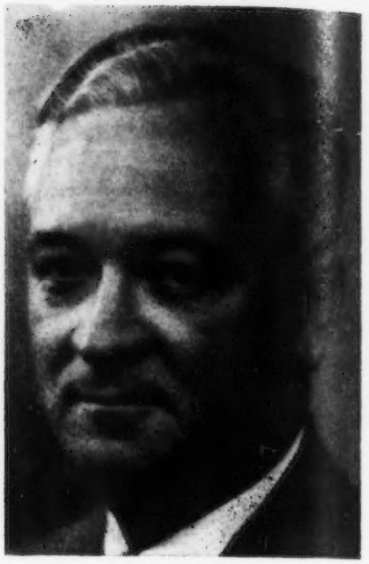
• **Arthur J. Krantz,** treasurer and general manager, Reeves Steel & Mfg. Co., Dover, Ohio, has been elected president of the company, succeeding H. C. Greer, who died. **James B. Shea,** general superintendent of the plant, has been named to succeed Mr. Greer on the board.

• **Oliver H. Schaaf,** formerly vice-president and general manager, Air-Maze Corp., Cleveland, has been elected president, succeeding **A. E. Schaaf,** who has been made chairman of the board of directors. The newly-elected president continues as general manager of the company.

• **Robert F. Black,** who formerly served as manager of the Houston office of Permanente Products Co., has been named district sales manager of the Cleveland territory for that company. **C. S. French** continues as division manager and head of the Cleveland district offices in Cincinnati, Detroit and Atlanta.

• **Leslie E. Bluhm** has been appointed Milwaukee field engineer for Nelson Stud Welding Div., Morton-Gregory Corp., Lorain, Ohio. Mr. Bluhm represented the Nelson organization in Washington, D. C., as field engineer from 1945 to 1947, and recently returned to the company after more than a year as yard welding engineer in the Boston Naval Shipyard.

• **P. E. Sance** has been appointed general works manager of the Monessen and Allenport Works of Pittsburgh Steel Co., Pittsburgh. Mr. Sance formerly served as works manager of the Allenport plant.



JAMES J. NELSON, eastern sales manager, National Bearing Div., American Brake Shoe Co.

• **James J. Nelson,** formerly sales representative, has been appointed eastern sales manager of the National Bearing Div., American Brake Shoe Co., New York. Prior to joining the Brake Shoe Co., Mr. Nelson served as a divisional vice-president of the Baldwin Locomotive Works.

• **R. E. Bromley** has joined the staff of the Pittsburgh office of Samuel G. Keywell Co., Detroit. Mr. Bromley had been associated with Crucible Steel Co. of America for 27 years and for the past five years had been openhearth superintendent of Crucible's Midland Works.

• **George H. Bachman** has been appointed production manager, Superior Steel & Malleable Castings Co., Benton Harbor, Mich.

• **Kenneth D. Davis has** been appointed to the newly-created position of manager of ESnail Sales Div., Elastic Stop Nut Corp. of America, Union, N. J. Mr. Davis has been associated with the company since 1946 and had previously been sales engineer for the Indiana-Illinois territory.

• **Gilbert R. Funk** has been elected a director of Waukesha Foundry Co., Waukesha, Wis., and has been appointed works manager. Mr. Funk has been associated with the company for 20 years and has been in charge of manufacturing and engineering for the pump division.

GILBERT R. JARMAN, district sales manager, Columbia Tool Steel Co.

• **Gilbert R. Jarman** has been named district sales manager of the St. Louis territory of the Columbia Tool Steel Co., Chicago Heights, Ill. Mr. Jarman has represented Columbia in the Chicago district for several years.

• **Edward D. Murphy** has been elected a director of the National Can Corp., New York. Mr. Murphy has been identified with the corporation for many years and has been a vice-president since 1941.

• **E. S. Coldwell** has been elected president of Ford, Bacon & Davis, Inc., New York, and Ford, Bacon & Davis Construction Corp., Monroe, La., succeeding **James F. Towers,** who continues as chairman of the board of directors of both firms.

• **Wylie Brown** has been elected chairman of the board and continues as chief executive officer of Phelps Dodge Copper Products Corp., New York. **Whipple Jacobs,** formerly president of the Belden Mfg. Co., Chicago, has joined the corporation as president.

• **Carl E. Von Luhrte** has been promoted from sales manager of the Western Div. to director of sales of Chicago Retort & Fire Brick Co., Chicago. **Robert P. Stevens** has been made sales manager. He had previously served as Eastern Div. sales manager.

• **John S. Coleman** has been elected to the board of directors of Fruehauf Trailer Co., Detroit.

• **Leo B. Grant** has been named manager of the New York office of Dow Chemical Co., succeeding **Ralph E. Dorland,** who died. Mr. Grant had been associated with the magnesium division of Dow in Midland, Mich., for 20 years before joining the executive staff of the New York office a year ago.

ROBERT F. OHMER, president, New Wrinkle Inc. and Chadeloid Corp.

• **Robert F. Ohmer** has been elected president of New Wrinkle, Inc., and Chadeloid Corp., Dayton. Previous to his election, Mr. Ohmer served as vice-president of Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.

• **R. L. Perin** has been made general sales manager of Continental Can Co., New York. Mr. Perin formerly served as central division sales manager. He joined the company in 1928.

OBITUARY...

• **Andrew Brady,** 92, owner, Emporium Iron Co. and one-time general manager of the old Cornwall Iron Co., died at Wellsboro, Pa., Dec. 31.

• **J. William Ekegren,** 54, secretary and treasurer of Accurate Bushing Co., Garwood, N. J., died Dec. 17.

• **Charles H. Gallmeyer,** 68, president, Gallmeyer & Livingston Co., Grand Rapids, died Dec. 31.

• **Fred W. Gollbach,** 59, founder and president, Ace Tool & Die Co., Detroit, died Dec. 30.

• **William J. Buttfield,** president, Vulcan Detinning Co., Sewaren, N. J., died Dec. 30.

• **A. D. Shankland,** metallurgical engineer, Bethlehem Steel Co., Bethlehem, died Jan. 5.

• **Henry G. Weaver,** 59, director of the customer research staff, General Motors Corp., Detroit, died Jan. 2.

• **Martin E. Conry,** 58, mining engineer for the Continental Gin Co., Birmingham, died Dec. 27.

• **George D. Ingram,** 74, public relations officer of Iron & Steel Products, Inc., Chicago, died recently.

• **Frederic W. James,** designing engineer, Nelson Iron Works, Passaic, N. J., died Dec. 28.

• **George V. Parkins,** 69, retired president, McKeesport Tin Plate Co., McKeesport, Pa., died recently.

• **David P. Graham,** vice-president, Peabody Engineering Corp., New York, died Dec. 18.

• **Philip S. Cotton,** 41, structural engineer, Jackson & Moreland Co., Boston, died Dec. 19.

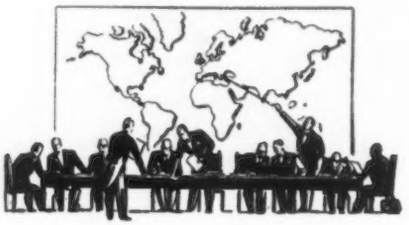
• **Guy H. Knowlton,** 66, retail manager, Root, Neal & Co., Buffalo, died Jan. 3.

• **Merle A. Tran,** 52, chief metallurgist, Park Drop Forge Co., Cleveland, died Jan. 6.

• **Lee D. Mercer,** 74, assistant sales director, Sheet & Strip Div., Republic Steel Corp., Cleveland, died Jan. 11. Mr. Mercer's association with the steel industry and companies which through consolidation became parts of Republic, began 43 years ago when he entered the employ of Stark Rolling Mills Co., in Canton, Ohio.

European Letter . . .

• Shock to European economic system anticipated at termination of foreign aid . . . Convalescence must extend beyond 1952 . . . Removal of deficit more effective aid than charity in meeting it.



LONDON—The Interim Report prepared by the Organization for European Economic Cooperation in Paris on the 19 separate national plans for western European recovery is, contrary to many forecasts and expectations, an admirable document. Ever since it became widely known that the 19 plans did not form a naturally harmonious whole, many observers assumed that whatever document was finally produced would seek to spread plaster over the cracks. In the event the report, which has been drafted by the Executive Committee and the Secretariat of OEEC, has pulled none of its punches. The economic straits of the Marshall countries are exposed, with little attempt to soften the austere outline or sweeten the bitter draught. It is true that the report does not commit any government. It is also true that it contains only the merest outline of a plan of action. But all effective planning must proceed from an unbiased and factual analysis, however unpalatable, and this the report achieves.

The first comfortable assumption that the report demolishes is the belief that Europe's economic plight is a temporary phenomenon brought about by the dislocations of war. If this were all, the difficulties should have virtually disappeared by now. Europe's standards of production are very nearly restored to the prewar level—a process which took seven years after 1918. The truth is that the two wars have aggravated, but not caused, a crisis which has its roots in a general change in the world's economic relations. Europe achieved its wealth, predominance and population, twice that of America in a similar area, at a time when it was the world's chief industrial supplier. But between 1870 and 1938, while the production of manufactured goods quadrupled before the first world war and doubled after it, the share of manufactures in world trade fell steadily from one-third to one-tenth. The nations were ceasing to buy Europe's products in the same quantities, and between the wars western Europe failed to balance its purchases by sales abroad.

IN the past 10 years, the war has aggravated these existing tendencies by decreasing Europe's capacity to produce, by keeping its manufactures out of foreign markets for nearly 10 years, by increasing its dependence upon American supplies and by wiping out most of its sources of invisible income. The result in 1947 was a catastrophic deterioration of the situation, but it was only a severe crisis in an existing malady. The disease had been chronic since the first world war.

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The second assumption which cannot survive the publication of the interim report is that the problem of restoring European standards of living and European viability can be solved by 1952. The 19 governments, in their several plans, have put the most favorable light that is possible upon their proposals for production at home and for foreign trade.

The conclusion to be drawn is inescapable. Whatever its labors—and even the most moderate estimate proposed in the interim report demand heroic efforts—western Europe cannot achieve a balance by 1952 on the basis of its present plans, of its present standards of living, and of the existing conditions of world trade. If no further action is taken, the shock to the European economic system caused by the ending of foreign aid will bring such economic and social dislocation that political stability will be undermined.

This means, of course, that the Marshall Plan, in the rather simple form originally conceived, cannot succeed within the time originally set. It does not, of course, in the least follow—as all the Marshall Plan's enemies will hasten to proclaim—that it has failed, or still less that it was unnecessary or ill-conceived. On the contrary, everything that has happened in the past 18 months has underlined the statesmanship of Mr. Marshall's initiative. What the report makes clear is that the malady is more obstinate and deep-seated than was thought.

Nor, above all, does this conclusion mean that western Europe has no alternative but to settle down to being a permanent pensioner of the United States. The present report is more concerned with analysis than with proposals for further action, but it does sketch very briefly three lines on which policy can proceed. First, western Europe's dollar deficit could be removed if sources of supply could be developed in non-dollar areas of the articles now imported from the dollar area. Secondly, western Europe could sell more to the United States, either directly or indirectly. Thirdly, it could reduce the level of its imports. Something can and should be done along each of these lines. But no one of the three can be pushed very far, certainly not by 1952. The development of non-dollar sources of supply is essentially a long-term business: it will require the investment of vast amounts of scarce capital resources, and in any ultimate sense it is a confession of defeat to spend capi-

tal on duplicating productive resources that already exist in the dollar area. The European nations should obviously do what they can to develop their exports to the American market, but any large-scale success in this depends far more on American policy and on conditions in the American economy than it does on Europe's own efforts.

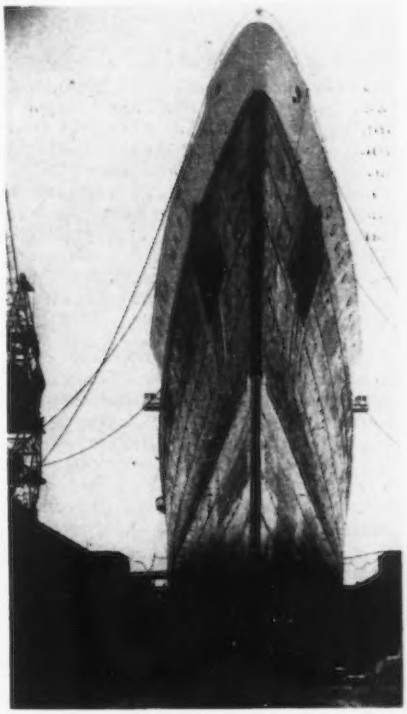
THE third course, that of cutting out all unnecessary imports, is the only one that is wholly within the decision of the European Governments themselves. More should be done in the control of imports by many countries than they have hitherto been willing to do. Yet restriction of trade is always undesirable and might well be disastrous. It is possible to spread the burden of reduced imports so equitabily that social cohesion is not damaged thereby. The British people have done so. But in countries where the skill of the administration and the discipline of the people are less than they are in Britain, the cutting back of imports on a big scale in the next two or three years, a reduction which would undoubtedly lead to fewer consumer goods and more unemployment, might precipitate the kind of instability and revolt which the whole Marshall Plan has been designed to check. This is not to say that reductions must not be attempted. It is simply to point out that a decision to carry them through on the scale necessary to solve the problem of Europe's balance of payments might have a result only slightly less violent than that of drifting unprepared into the crisis of 1952.

In short, there is no line of policy that is both rapid in action, within Europe's own powers and also politically safe. It would be very silly to despair; adjustments in the economic life of nations can always be made in the end. But two conclusions that were not seen in 1947 when the Marshall Plan was first envisaged are now very clearly visible. The first is that the adjustments are too large to be accomplished within four years; the period of European economic convalescence will have to be extended beyond 1952. The other is that western Europe's crisis is insoluble if it is considered simply in terms of western Europe. There is no means by which the Marshall countries can, even with the present scale of American aid, prevent a serious fall in their standards of living in 1952. They have not the resources to repair the damage of two world wars and at the same time arrest and entirely reverse an economic trend which has been going on unchecked since 1913. They cannot pull themselves up by their own heelstraps or, at least, they cannot do so by 1952. If the time were longer, 15 or 20 years, they could do more; but as a four-year proposition, the task is beyond their joint resources.

NOBODY should be so foolish as to imagine that any such conclusions are likely to be palatable to American opinion even with Mr. Truman reelected and a Democratic Congress. Marshall aid was accepted very largely because it was thought of as the aid to end all aid. America was solemnly assured that four years would be enough. The discovery that this is not so will be greeted with indignation as well as regret.

There is one way in which American indignation may possibly be forestalled. It does not inevitably follow from the forecasting of a dollar deficit in 1952 that further appropriations of the American taxpayer's money will be needed thereafter. American assistance will certainly be needed for many years to come, but it will be far healthier and more effective if it takes the form of assistance in removing the deficit than of charity in meeting it. There is a sense in which Marshall aid itself creates the dollar deficit. Certainly, as long as free dollars are forthcoming, there is something less than the maximum pressure on European nations to cut their imports to the bone. And so long as European purchasing power in world markets is buttressed by Marshall dollars, the odds are lengthened against that readjustment of the terms of trade between European manufacturers and extra-European primary producers which is an essential ingredient in any ultimate rehabilitation of Europe.

BUT even if American assistance, in the longer term, need not take the form of dollar grants, it will still inevitably require deep drafts on American generosity and breadth of mind. American export industry may have to reconcile itself to the permanent loss of its European markets; it may have to permit discrimination against itself. American capital may be invited to assist in the development of natural resources, in Africa, for example, which are at least in part substitutes for American sources of supply. Above all, American opinion may have to face the necessity of making a permanent and painful adjustment in its own economy. It has often been insisted that there were two elements in the dollar shortage, a European problem and an American problem. This is now clear for all the world to see. If Europe, after doing what it can, will still have a deficit of $3 billion, somebody will have a surplus of $3 billion. The one cannot be removed without the other. Certainly the debtors cannot, by taking thought and drawing up plans, remove their deficit unless the creditors will also take thought—and perhaps even draw up plans—about their surplus. The next stage should be a Marshall Plan for the creditors.



SKYLINE: *Thousands of tons of steel molded into the structure of a luxury liner, the Queen Mary, rests at the drydocks at Southampton after probably one of the most profitable seasons in years. Many see her afloat, but only repairmen have the privilege of seeing her in all her magnitude.*

• **NEW EXTRA SETUP**—Republic Steel Corp.'s recent revision of the method of quoting galvanized sheet extras was prompted by the high cost of zinc which the former method of quoting in blocks of four gages, with three or four extras covering some 16 different gages of sheets did not reflect fairly. Light gage sheets require more zinc per ton than heavy sheets. Under the new method of quoting there is a galvanizing extra for each gage. Light sheets carry a higher extra. Heavy sheets carry a lower extra. The present cost of zinc made the old method of quoting extras obsolete. Producers were receiving proportionately too much on heavy sheet extras and too little on light gage sheet extras.

• **LATE SANTA**—December scrap imports from Germany totaled 106,000 tons. This is the largest monthly total since shipments started last July. Total for the first six months of exports from Germany to the U. S. thus stands at 338,900 tons—and there's more coming, according to Commerce Secretary Sawyer. Here's the way shipments have been running: July, 9500; August, 24,700; September, 67,000; October, 51,000; November, 80,700; December, 106,000.

• **STEEL EMPLOYMENT**—Employment reached a postwar record in the iron and steel industry during November when 646,200 made the payrolls of 119 companies representing 93 pct of the industry's capacity. This is 1700 over the preceding month and 22,700 better than the corresponding month of the previous year.

• **INCREASES PLATE FACILITIES**—The Central Iron & Steel Co. of Harrisburg, a subsidiary of the Barium Steel Corp., has spent approximately $2 million during the past year in the addition of steelmaking and plate rolling facilities, according to the Barium Steel management. As a result of these improvements Central Iron & Steel has substantially increased its ingot capacity and doubled its plate finishing capacity.

• **STEEL PAYROLL**—Steelworkers made $40 million more during the first 11 months of 1948 than they did during the entire year of 1947, according to the American Iron and Steel Institute, or nearly 12 pct more than for the corresponding period in 1947.

• **STOCK DEPOSITED**—More than 30,000 shares of Taylor-Wharton Iron & Steel Co. had been deposited with the Chase National Bank of New York by Jan. 17, the last day of the offer to purchase by Cincinnati interests. Since the number of shares deposited is well below the minimum number of 56,668 shares specified in the offer, there is no compulsion to buy the deposited stock.

• **FOLLOW THROUGH**—Three members of Congress lost no time last week in introducing bills to allow government entrance into the steel business. Similar bills sponsored by Senators Sparkman, D., Ala. and Murray, D., Mont. in the upper chamber and Representative Patman, D., Tex. in the House would set up a $15 billion kitty for government construction of new productive facilities. Federal loans could be made to states or regional agencies for local administration of the huge program. The sponsors describe the measure as a "full employment act" and state its enactment is necessary to meet "ominous signs of weakening in some lines of business activity."

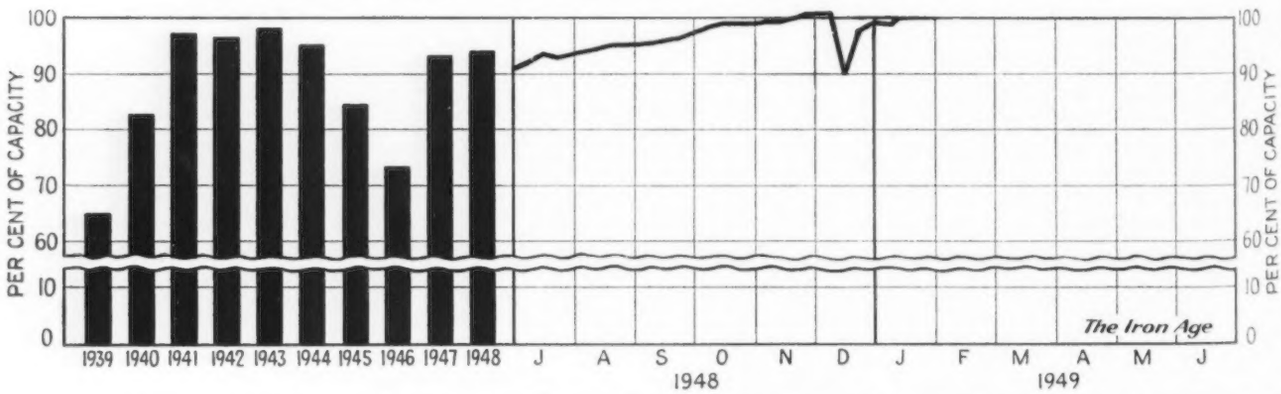
• **PIG IRON COMPOSITE DROPS**—THE IRON AGE pig iron composite dropped 4c this week to $46.78 because of the drop in the price of No. 1 heavy melting steel scrap in the Buffalo area on which the Republic Steel Co. pig iron price is based. This is the first drop in the pig iron composite price since Mar. 9, 1948.

• **TEMPORARY CUT**—Inland Steel Co. last week started on another segment of their expansion program. Eventually the entire project will add about 600,000 net tons per year to their ingot capacity. Part of the project most recently gotten under way was the rebuilding of 15 of their 24 openhearth furnaces in the No. 2 openhearth shop. At the moment the rebuilding of these furnaces will decrease their ingot output. This part of the expansion and modernization program will embrace two furnaces at a time. It will take about one year to complete this particular part. During this time Inland will lose the output of two openhearth furnaces. This means of their total of 36 openhearths, only 34 will be available for use during 1949.

• **CAR PRICES MOVE UP**—Average retail price of new passenger cars in 1948 was about $1714, an increase of $130 over the 1947 figure. A new record was set for the production of replacement parts which had a wholesale value of $2.6 billion for 1948—10 pct above the 1947 total and about four times the prewar rate.

• **JOHNSON SETS HEARINGS**—Congressional hearings on new legislation to permit freight absorption will get under way in Washington on January 24. Senator Johnson, D., Col., new chairman of the Senate Trade Policies Subcommittee, says he wants "a bill which will not in any way weaken the antitrust laws but will, in fact, strengthen these laws without denying to competing sellers the right to absorb freight to meet competitors' prices, when they do so in the absence of conspiracy." Federal Trade Commissioners are scheduled to be among the first to present their views at the hearings.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 11	100.5	100.5*	94.0	99.0	98.0	105.0	98.0	102.0	104.5*	102.0	107.0	80.0	97.5	99.5
January 18	101.5	99.0	94.5	99.0	100.5	105.0	98.0	102.0	102.0	99.0	107.0	84.5	98.5	100.0

* Revised.

Industrial News Summary

- **Steel Demand Still Holds Up**
- **Easiness Is Some Months Away**
- **Scrap Markets Point Downward**

THE talked about easing of steel demand is still sometime in the future. How long no one really knows. But there is increasing evidence that more output and a slower pace in demand will make things much better by midyear. This does not mean that anyone can get anything he wants in steel by that time.

This week demand is still strong for all carbon steel items. It is not so strong for some alloy steel products. That market seems to be reaching balance quicker than carbon steel items. But there is still no evidence this week that buyers are finding it easy to get what they want—when they want it.

A close check by IRON AGE editors and correspondents in principal cities of all areas showed that steel buyers and sellers were unaffected by President Truman's messages. In most cases businessmen showed no surprise over what the President had said. Nor did a close check show that anyone was changing his business sights as an aftermath of the speeches. This agrees with earlier reports that projects under way would be completed. And that others in the planning stage would be continued.

In checking specific steel markets it was found that automobile people say they hope and think steel might be easier later in the year—but that time is not here yet. Most auto people still feel that the only thing keeping them from making new production records is lack of steel.

The oil and gas industry is still one of the prime buyers of steel and a supporter of the conversion market and the gray market. This week there are changes in conversion deals. Some steel users are cutting the amount of ingots bought for conversion. But other users are taking up the slack. There is no clear-cut evidence that people using conversion methods of getting more finished steel are yet ready to depend on regular mill sources.

A CHECK with some steel companies which have been converting steel from ingots furnished them showed no big drop in conversion tonnages—except in one instance. That exception occurred several weeks ago and there has been no further change. But there is plenty of talk that conversion deals are on the down grade. Such talk may yet be supported by the real thing. But that time has not come yet.

The gray market is now only a shell of its former self. Gone are the days of big activity in some brokers' offices. The only use which that market serves now is emergency supply. There are plenty of offers but few takers. What there is left of the gray market is taken care of by in-and-outers—those who need a small amount of stuff to keep operation schedules at a point where more profit for the manufactured product is possible.

As these in-and-outers get a little more steel from regular mill sources they too will leave the gray market in the lurch. To all intents and purposes the gray market is no longer a real factor in the steel market—that is tonnagewise.

There is one other market which must go out the window before steel can be said to be in a normal condition. That is the premium market, where steel is sold by steel companies at prices higher than the majority of firms quote. This applies in some cases to plates, sheets, bars and some structurals. A check on those firms which have higher than average prices for some products shows no fall in demand. Thus there has been no reason to reduce these premium prices which they say are based on higher costs. Competition, brought on by less demand, will drop them like a hot potato—but that time is not yet here either.

THE scrap markets are still jittery this week. Hardest hit is the cast iron scrap market. Prices have plummeted in those grades. In Chicago No. 1 cast iron scrap has dropped $15 a ton in the past 3 weeks. In Pittsburgh the drop has been $5 a ton, in Philadelphia it has totaled $8.50 a ton in 3 weeks. The drop in cast grades is due to (1) open weather (2) better pig iron output and (3) less foundry activity.

Steel scrap is hanging on the ropes in the major centers. There is no quotable change in prices of heavy melting after last week's $2 drop. But in the minor markets the price of heavy melting steel has slid off again with decreases ranging from 50¢ to $1.00 a ton. The weakness in some of the secondary areas may be a forerunner of further dips in such markets as Pittsburgh, Chicago and Philadelphia. Time will tell.

The steel ingot operating rate is up one half a point this week to 100.0 pct. It is based on the new capacity figures, hence a new weekly record has been established. Steel is being poured out at a rate of 96 million tons a year. Such a figure was unheard of a few years ago, and, before the war, would have been considered fantastic.

Enlargement shows a scored and galled surface of a 3½" O.D. bearing that "froze" and failed. Had this surface first been Superfinished, it would have had nearly twice the load-bearing capacity and about three times the life. "Wear and Surface Finish," is a new textbook on Superfinish. Write for it on your company letterhead.

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Business Reacts Mildly to President's State of Union Message

Fireworks Come From Press; Businessmen Worry More About Competition

o o o

New York

• • • **President Truman's** report on the state of the union provided plenty of pyrotechniques for editorial writers and columnists from coast to coast. But it got little reaction from business. That which caused the press to scream "Socialism" was received by the nation's businessmen with mixed emotions—none of them violent.

In interviewing businessmen in principal cities of all sections of the country IRON AGE reporters found indifference, contempt and resignation to be the chief reactions. Nowhere was there any real expression of alarm. Comments most commonly heard were: "He just repeated what he's said a dozen times before," and "He said just what I expected him to say."

Of all the businessmen contacted, not one admitted that he had changed his business plans in any way as a result of the President's message. This might be significant. At least it is interesting. All said that improvements or expansions presently underway would continue as scheduled. They report business generally good with no change in order volume.

Even the President's remarks on steel failed to cause any high blood pressure. They were received by many with mild surprise, but not with alarm. While editorial writers were pouring out obituaries on the steel industry, the industry was pouring out record tonnages of steel. It was announcing its increased capacity. And it was searching for new sources of raw materials to feed its furnaces.

Undoubtedly much of the wind was taken out of the President's trial balloon on steel because its launching was so poorly timed. There were growing reports of softness in some lines of goods. Appliances were off. Foundries were slumping. There were predictions of a buyers market in 1949 on many items which had been hardest to get—even automobiles. Pressure for steel was reported easing — this by people who should know. Cancelled conversion deals and slipping gray market prices had already caused some to predict that '49 would be the year when supply and demand would swing into balance.

Steel people are cognizant of this when they retort, "Does Washington want more steel production or socialization in steel?" Here's how they size it up:

If more steel is wanted for the nation, and at less cost, the solution is relatively simple. There are a lot of steel companies that could add substantially to their production with a new coke oven here, a blast furnace there, here a soaking pit, there an openhearth.

Expansion or Socialism?

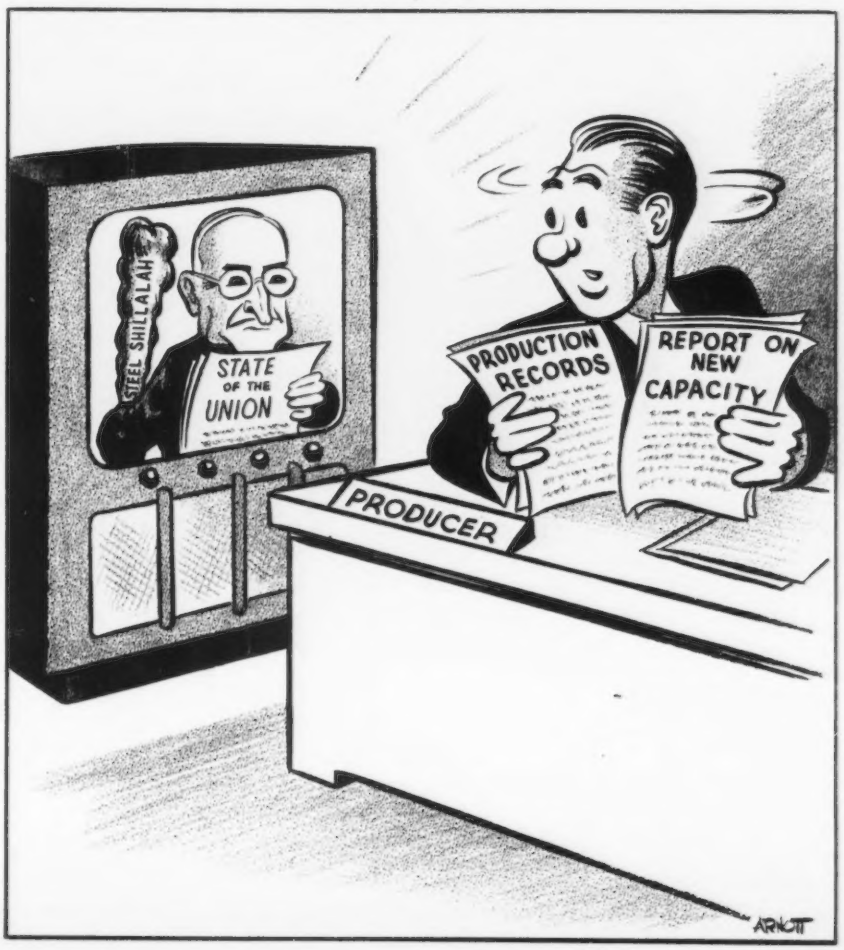
New York

• • • In his state of the union message 2 weeks ago President Truman asked for eight specific pieces of legislation. Only the last caused mild surprise. It struck at steel.

The President asked congress to: (1) Authorize an immediate study of the adequacy of production facilities for materials in critically short supply, such as steel; (2) if found necessary, to authorize government loans for expansion of production facilities; (3) to authorize construction of such facilities directly if action by private industry fails to meet our needs.

IRON AGE editors and correspondents have canvassed the businessmen of the nation to find their reaction to the President's message.

Who, Me?



In some of these plants finishing facilities exceed melting capacity, in others the reverse is true. Balancing these items out in mills throughout the country would cost at most $50 per ton of new capacity.

If the idea is for the government to jump into the steel business — that is a different story. Building new plants from the ground up would take more steel out of current supplies, require several years longer and cost between $250 and $300 per ton of capacity.

How to finance additions to existing steel plants is a hot subject. Government financing, some steel men say, would permit the government to run the industry. The other side of that argument is that the government has owned a lot of steel facilities since the war and still owns some. It exercises only a limited control on some steel distribution. Once, when RFC felt it might be stuck with a loan it put on enough pressure to see that its debtor got steel.

Basically of course, steel companies would prefer no government interference at all. They believe their own individual programs will take care of demand. An idea to their liking would be permission to amortize new facilities over a 5-year period, as they did during the war. On this subject Henry J. Kaiser, who has a big RFC loan said:

"If President Truman with congressional support should immediately cause the passage of a proposed bill for accelerated depreciation, the President likely would find an expansion by industry exactly as took place during the war when accelerated depreciation caused an expenditure of $6.5 billion."

Mr. Kaiser observed that should there be failure to obtain needed industrial expansion, privately financed through adoption of accelerated depreciation, certain members of congress are advocating that RFC be revitalized to finance needed industrial growth.

Some of the people contacted seemed to be worrying about raw materials as much as capacity. They cited that production is what really counts, not capacity. One said it humorously—"Maybe what we ought to do is raise our capacity figure 10 million tons and lower our operating rate."

Possibly steel people are a bit smug about their production records and new capacity figures. Possibly other businessmen are worrying about the return of competition. But few seem to be worrying much about what the President said—only the editors.

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

NOVEMBER - 1948
Month

Steel Products	Number of companies	Items	Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Current Month: Per cent of Total Shipments	Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year: Per cent of Total Shipments	To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Whole Year 1947: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Whole Year 1947: Per cent of Total Shipments	Whole Year 1947: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	284,905	5.0	270,945	2,857,161	4.8	2,991,958	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	368,130	6.4	1,892	3,861,471	6.5	22,873	4,436,129	7.0	2,640
Steel piling	4	3	23,087	0.4	111	269,054	0.5	1,435	324,224	0.5	23
Plates (sheared and universal)	29	4	629,475	11.0	25,438	6,342,426	10.6	335,563	6,345,216	10.1	219,227
Skelp	7	5	7,361	0.1	45,016	67,071	0.1	480,140	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	175,407	3.1	1,537	1,805,703	3.0	12,273	2,207,148	3.5	991
—All other	5	7	14,507	0.3	44	195,846	0.3	1,035	211,900	0.3	329
Joint bars	7	8	10,557	0.2	5,039	124,304	0.2	39,436	173,923	0.3	15,198
Tie plates	7	9	39,234	0.7	31	447,783	0.8	369	504,779	0.8	4,437
Track spikes	8	10	13,013	0.2	32	132,206	0.2	605	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	533,608	9.3	56,773	5,539,128	9.4	568,914	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	103,615	1.8	740	1,212,063	2.0	6,442	1,277,075	2.0	9,775
—Rerolled	13	13	15,547	0.3	-	193,833	0.4	-	175,833	0.3	-
—Alloy	27	14	164,501	2.9	18,364	1,739,512	2.9	205,118	1,741,432	2.8	212,382
—Total	44	15	817,271	14.3	75,877	8,784,536	14.7	780,474	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	28	16	119,405	2.1	579	1,225,124	2.0	6,096	1,426,701	2.3	9,249
—Alloy	27	17	24,891	0.4	667	218,264	0.4	5,717	218,802	0.3	2,501
—Total	35	18	144,296	2.5	1,246	1,443,388	2.4	12,813	1,645,503	2.6	11,850
Tool steel bars	18	19	8,383	0.2	33	81,191	0.1	1,444	87,279	0.1	1,610
Pipe & Tubes—Butt weld	16	20	185,891	3.3	2,567	1,845,466	3.1	25,637	1,892,691	3.0	78,080
—Lap weld	8	21	27,980	0.5	-	311,617	0.5	3	389,752	0.6	875
—Electric weld	13	22	134,041	2.3	393	1,432,006	2.4	4,801	1,254,325	2.0	4,274
—Seamless	17	23	266,141	4.6	13,149	2,655,598	4.4	153,222	2,581,106	4.1	157,208
Wire rods	22	24	24,312	0.4	22,273	528,473	0.9	275,268	667,282	1.1	331,192
Wire—Drawn	39	25	258,482	4.5	14,441	2,461,247	4.1	161,108	2,590,963	4.1	181,783
—Nails and staples	17	26	70,700	1.2	1,065	786,634	1.3	11,932	799,436	1.3	8,481
—Barbed and twisted	15	27	21,123	0.4	3	231,514	0.4	429	256,991	0.4	128
—Woven wire fence	13	28	33,979	0.6	458	365,498	0.6	3,538	407,295	0.6	3,616
—Bale ties	11	29	7,983	0.1	-	107,334	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	69,395	1.2	-	740,811	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	2,103	-	-	14,545	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	9	32	170,758	3.0	-	1,946,480	3.3	259	2,093,149	3.3	228
—Electrolytic	9	33	144,435	2.5	-	1,606,043	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	666,631	11.6	54,315	7,078,570	11.8	583,139	7,891,798	12.5	578,426
—Cold rolled	16	35	608,448	10.6	2,406	6,238,628	10.4	19,280	5,504,578	8.7	28,498
—Galvanized	16	36	142,931	2.5	317	1,503,654	2.5	2,735	1,609,881	2.5	869
Strip—Hot rolled	23	37	145,554	2.5	32,381	1,519,839	2.5	339,982	1,740,085	2.7	308,655
—Cold rolled	34	38	165,304	2.9	1,633	1,627,380	2.7	22,168	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	29,758	0.5	58	306,413	0.5	1,004	356,873	0.6	2
Axles	5	40	20,681	0.4	25	195,481	0.3	143	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,732,256	100.0	572,705	59,915,371	100.0	6,285,936	63,057,150	100.0	5,717,765

During 1947 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

Steel Sees Weakness In Autos, But Auto Makers Say, "Not Yet"

Detroit

• • • **The automobile** industry knows the honeymoon can't last forever but it has no expectations of falling on its face in 1949.

Local representatives of the steel industry, on the contrary, view the situation somewhat differently. They say the auto honeymoon is within 4 or 5 months of being over. The cutbacks announced by Kaiser-Fraser and Lincoln-Mercury were just about all the evidence some steel men needed to convince them the auto market has hit the skids.

It is recognized, of course, that both parties may be slightly, if not grossly, in error. The auto industry is known to be perennially optimistic about its sales prospects. The steel industry here, on the contrary, has been heralding a break in the auto market for months. Almost any evidence that might be interpreted as indicating the return of a full-blown buyers' market is pounced upon.

From a welter of conflicting reports it appears that the important facts in the Detroit steel picture today are these: (1) Auto production chiefs are building their schedules upward for the present —not downward; (2) Conversion volume is holding for the moment except where mill steel is being substituted for conversion tonnage; (3) The demand for most bars and shapes is easing in Detroit but hot and cold rolled sheets and plates continue to be in great demand; (4) Warehouse sales are holding for most items; (5) There are no indications that auto suppliers have big banks of parts on hand. Even where over-production exists, it should be recalled that these items are usually sold both for replacement and for original equipment; (6) The pressures on steel suppliers have eased noticeably in recent weeks.

The auto industry continues to back up its optimism with its production schedules. General Motors has already announced its intention to build at least 10 pct more cars in 1949 than were assembled during 1948. This was reaffirmed this week by a company spokesman.

Longterm Outlook Best For Producers of Autos In Lower Price Range

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By WALTER G. PATTON
Detroit Regional Editor

o o o

Ford's schedules for 1949 had to be boosted more than 10 pct, if only to make up for the production lost during the model changeover last year. Chrysler will lose some production because of a model changeover and will undoubtedly boost its weekly output as soon as possible.

Several independent producers have told the IRON AGE they could use up to 20 pct more steel right now. These reports are confirmed by steel suppliers.

Further investigation shows the auto industry plans to make at least as many replacement parts during 1949 as it made during the past year. Truck schedules will be reduced somewhat, although the demand for light trucks will continue throughout the year, say the auto sales bosses.

Despite nationwide talk about the return of a buyers' market, the auto industry claims it needs more steel. The Lincoln-Mercury shutdown this week is attributed to a lack of steel at the same time some observers are saying that Lincolns are piling up in dealer's hands. This is denied, incidentally, by L-M sales officials who report a record-breaking month in December.

The auto industry is not dropping conversion except where mill arrangements have been made that eliminate the need for conversion. At least one auto producer is expected to reduce its conversion schedules to take advantage of new mill capacity later this year. Other producers will stick to their present arrangements and even increase the tonnage in some cases. They admit they have a sharp eye for cutting the high cost of conversion steel and will do so at the first opportunity.

Most steel buyers say ingots are

BUSY MACHINE SHOP—*Despite increased conversation in Detroit and elsewhere about the return of a buyers' market for automobiles, the Gleason room of the Chevrolet Gear and Axle plant in Detroit is working at capacity turning out parts for the new Chevrolet models. This huge battery of machines is required to cut teeth in differential drive gears.*

Industrial Briefs . . .

• ACQUISITION — Detroit Gray Iron Foundry Co. has announced the acquisition of the Oakland Foundry & Machine Co., Rochester, Mich. It will be operated as a subsidiary of the parent company. J. H. Gardner, formerly of Marshall Furnace Co., Marshall, Mich., will be vice-president in charge of sales.

• CANADIAN PLANT—The Electro Refractories & Alloys Corp., Buffalo, has announced the official opening of its new $350,000 electric furnace plant at Cap-de-la-Madeleine, Quebec.

• GOLDEN JUBILEE—M. B. Skinner Co. of South Bend, Ind., is celebrating its fiftieth year of service to various industries as suppliers of specialized pipe repair clamps and allied products.

• EXPANDS FACILITIES — Announcement was made recently of the enlargement of the office and warehousing facilities in Fresno, Calif., of the Drake Steel Supply Co. of Los Angeles. Cost of the additions approximated $50,000.

• ELECTS PRESIDENT—The Society of Automotive Engineers has elected Stanwood W. Sparrow president for 1949. Mr. Sparrow is vice-president in charge of engineering of Studebaker Corp., South Bend, Ind.

• MOVES—Kaiser Co., Inc., Oakland, Calif., has announced the transfer of the Northern California district sales office to Suite 211 of the Miller Brothers Bldg., 360 17th St., Oakland.

• TOOL DISTRIBUTOR—The Geometric Tool Co., New Haven, Conn., has announced the appointment of J. E. Haseltine & Co., 2nd Ave. and Ash St., Portland, Ore., as its distributor of standard threading tools and chasers for the states of Oregon, Washington, Montana and Idaho.

• BUYS STEEL PLANT—A group of Rhode Islanders have purchased control of the Newman Crosby Steel Co., Pawtucket, R. I., producers of cold-rolled steel. The group includes Robert G. Ashman, president and treasurer; Francis Locke, executive vice-president and Howard E. Boyd, secretary.

• MERGER—Universal Sanitary Mfg. Co., New Castle, Pa., and Rundle Mfg. Co., Milwaukee, manufacturers of kitchen and bathroom plumbing fixtures, will merge on Feb. 1. Headquarters of the new company will be at New Castle. The companies also have plants at Redlands, Calif., Camden, N. J., and Milwaukee.

• DOUBLES CAPACITY — Arwood Precision Casting Corp., Brooklyn, manufacturers of precision investment castings, has purchased in its expansion program the precision casting facilities of Precise Castings Corp., division of the Cooper Alloy Foundry Co., Hillside, N. J.

• OPENS SALES OFFICE — The Landis Tool Co., Waynesboro, Pa., manufacturers of precision cylindrical grinding machines, has announced the opening of a direct sales and service office in Indianapolis at 709 E. 38th St. A. J. Jones will be district manager.

• WESTERN OUTLET—H. K. Ferguson Co., industrial engineers and builders, has established a new Western district office at 712 Curson St. at Wilshire Blvd. in Los Angeles to be managed by Henry Maag.

• MOVES HEADQUARTERS — Announcement has been made that Joseph A. Voelker, vice-president of the Pittsburgh Steel Co. has moved his headquarters from Pittsburgh to the Chanin Bldg., New York. Carl L. Zak, general manager of sales, will assume direction of sales activities from Pittsburgh.

• REPRESENTATIVE — The Aldrich Pump Co. of Allentown, Pa., manufacturers of reciprocating pumps for medium and high pressure services, has announced the appointment of Jesse W. Eakins Co., 3105 East Grand Blvd., Detroit, as their representative for Detroit.

much easier than they were a few months ago. Some sources have reported there is less difficulty finding a place on mill schedules. Steel sources here believe a few cancellations by appliance makers and small manufacturers and increased production of ingots by steel foundries have contributed to the present easing of the ingot market.

Outwardly, at least, the auto industry is more worried about steel than it is about sales. At the same time, industry spokesmen are mentioning "buyers' market" much more frequently these days. Sales staffs are being rehearsed. Dealer meetings are being held more frequently and more earnestly than at any time since the war. One car producer has reported that car dealers' orders are now being scheduled in complete detail as to color, accessories and other specifications. No variation from the customer's order is permitted for any reason. The aim is, of course, to promote customer satisfaction, thereby lessening sales resistance.

If anybody here is worried it must be the makers of high priced cars—excepting Cadillac. But the production schedules of several who are supposed to be having sales problems are presently being increased.

Auto sales executives admit the recent drop in the used car market is a decisive factor in the present sales slump. They explain that the buyer who finds his used car allowance is off will often, of necessity, postpone a purchase. But as auto sources see it, come spring and the inevitable rise in used car prices, the situation may be largely corrected.

What the auto industry is inclined to interpret as a seasonal decline, the steel industry is inclined to believe is "the real McCoy."

Last week was a good example. The cutback at **Kaiser-Fraser** was immediately branded by some steel representatives as only the first break in the auto market. When the 10 pct cutback in Lincoln-Mercury was announced a day or two later, some steel representatives were willing to assert their case had been proved. "This is it," they said, with unconcealed pride in being right.

The auto industry's view of the present situation is something

quite different. There is not complete agreement with Henry Kaiser that Regulation W is the whole story behind the K-F cutback. Henry Kaiser, many new car dealers and the overwhelming majority of the used car dealers blame the Federal Reserve regulation for a good share of the slump in auto sales. In fact, anybody who has recently lost an auto sale naturally blames Regulation W. It is much easier to say, for example, "the payments are too high" than it is to say, "the *price* is too high!"

Other auto producers admit Regulation W may be a factor in the sales situation but they decline to identify it as a major consideration. "The 18 months restriction," they say, "operates most effectively as a barrier against new car sales because it retards the used car sales volume." This is substantiated by the closing of a number of used car lots in the Detroit area.

It seems fairly obvious that most stories about the auto market have to be liberally discounted, whatever the source. But the old timers who have watched the fortunes of the auto industry for years will take you aside and give you this advice: "If you're placing any bets, Bub, put your money on the guys who are producing the lowest price cars because they get a shot at a lot of the customers who are falling out of the higher-priced markets."

Buys Acro Electric Co.

Cleveland

• • • **Acro Electric Co.**, manufacturers of rolling spring snap action switches, has been purchased by a Pittsburgh group, including Willard F. Rockwell, Jr., president, Rockwell Manufacturing Co., Pittsburgh.

Acro Electric Co., which employs 150 workers and produces about $1 million of products annually, will be expanded.

F. G. McCloskey is the new president of Acro while Fred Lynn remains as vice-president and general manager. A pioneer in the snap action switch industry, Acro is currently producing fully enclosed and open blade switches used in a wide variety of products that range from aircraft to coin-operated machines and office appliances.

ECA Commission Suggests Ruhr Produce Oil Equipment for Middle East

Dusseldorf

• • • **An ECA Commission** has proposed that wide gage oil pipe and other equipment for development of Middle East oil lands be provided by the steel industry of the Ruhr. Lack of such equipment has been holding up these projects.

The proposal appears to have a good chance of being accepted by the Western governments, who are currently negotiating on the question of dismantling of German plants (THE IRON AGE, Nov. 11, 1948, p. 147). Not that they favor revival of the German steel industry—they look upon that with abject horror. But they would like to see development of the desert oil fields go ahead. The ECA suggestion might prove the best workable answer.

Britain does not produce wide gage pipe. Although the United States would appear to be the natural supplier, pipe, especially of this type, is one of the tightest items in the American steel market. Some pipe from American mills has been made available for Middle East projects, but not nearly enough.

Dalmine, Inc., a division of Finsider, Italy, is supplying some pipe to the Middle East. The Dalmine works makes seamless line pipe up to 32-in. diam. It makes threaded casing up to 13 3/8-in. diam. But output of this works is limited to 250,000 tons annually. At the present time it has orders booked through the end of 1950.

The ECA proposal specifically points to the tube works of Mannesmann at Dusseldorf. This plant was severely bombed on Nov. 2, 1944. It was shut down completely in March, 1945, due to artillery fire. However, the tube mills were only slightly damaged. Equipment includes Pilger (tube or pipe) mills, one capable of rolling very large diameters. It can accommodate material 25 meters long, plus or minus 13 pct tolerance on thickness, plus or minus 1½ pct tolerance on cut of round.

Pipe cooling beds consist of rollers made up of alternating conical sections and placed askew. This causes pipe to rotate as well as travel, thus preventing black spots.

Members of this commission told the Germans that the Ruhr output of steel ingots, now at a rate of about 7.2 million tons a year, was chicken feed which shouldn't frighten anyone. U. S. production last year was more than 88.5 million tons of ingots. Output for 1949 has been variously estimated at well above 90 million tons.

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BRIDGE GIRDER: *Workmen are shown fabricating a large girder for a section of the new South Capitol Street Bridge over the Anacostia River. The American Bridge Co. will erect the bridge in the nation's capital. This girder alone requires* 1200 *steel rivets, each* 1 *in. in diam.*

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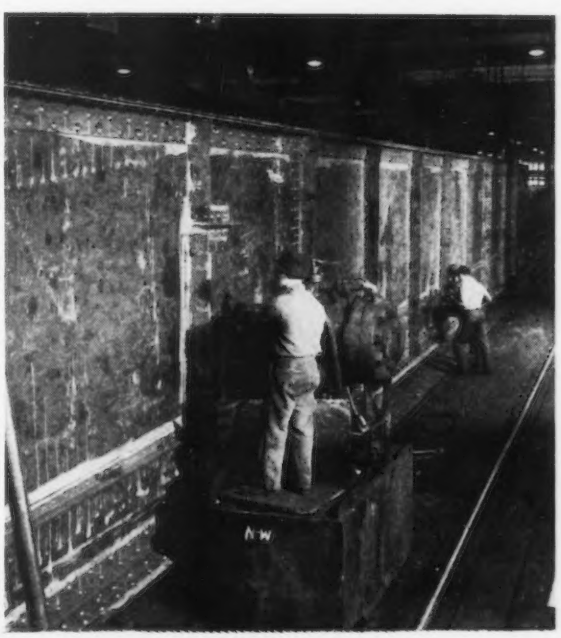


New England Machine Tool Builders View 1949 With a Prayer

Boston

• • • **At the start** of 1949, the status of New England machine tool builders was exactly as it was at the start of 1948. Now, as then, the industry is praying the European recovery plan will involve export business; many, however, having given up hope.

The industry also is praying for domestic business. In this respect they look to the automobile and airplane industries but are frank to say little encouragement is anticipated the first half of this year.

However, because the volume of business as compared with war years is so small, many tool makers talk little about current domestic business. Tool buying is by no means at a standstill, inasmuch as a majority of builders are doing something all the time. Some are making new kinds of machinery and parts for same. Nobody had to shut up shop for lack of funds. Employment at tool making plants is holding up remarkably well in view of the movement of new machine tools.

Two things the industry is very thankful for:—One, the dearth of surplus government owned equipment, the other the lack of worry regarding prospective excess profits taxes.

Coal Machine in Alabama

Birmingham

• • • **A continuous** coal mining machine, the first to be used in the South, has been put into experimental operation by the Tennessee Coal, Iron & Railroad Co., Birmingham. A. V. Wiebel, TCI vice president in charge of operations, said installation was on a trial basis "and it remains to be determined if it can be used in the Alabama coal seams, many of which contain thick partings of rock."

To Study Japanese Steel

San Francisco

• • • **Ronald Scott Coulter,** 3011 Beverly St., San Mateo, Calif., combustion engineer for Bethlehem Pacific Coast Steel Corp., has been appointed to a four-man government commission to study problems related to the steel industry of Japan.

Mr. Coulter, a specialist in Bethlehem Pacific's fuel and combustion problems, is a graduate of the Colorado School of Mines. Following graduation he started at Bethlehem Steel Co.'s Sparrows Point plant in the engineering department. In 1936 he became combustion engineer for Bethlehem Pacific.

Auto Employment Down

Detroit

• • • **Employment** in manufacturing plants of the state of Michigan decreased 0.3 pct during November, according to the Michigan State Labor Dept's. monthly survey of employment hours and earnings.

The dip in employment is even larger for Wayne County in which much of the automotive activity is concentrated. The November index for Wayne County is 79.3 compared with 79.9 in October. A similar decrease was noted for all automotive and parts plants in the state.

Weekly payrolls for the automotive industry decreased 0.8 pct. Average weekly hours worked is 38.0 for November and average weekly earnings totaled $65.20. The average hourly earning figure is $1.715.

More than 75 plants in the automotive industry contributed data which was used in compiling the report.

Opens New Sales Office

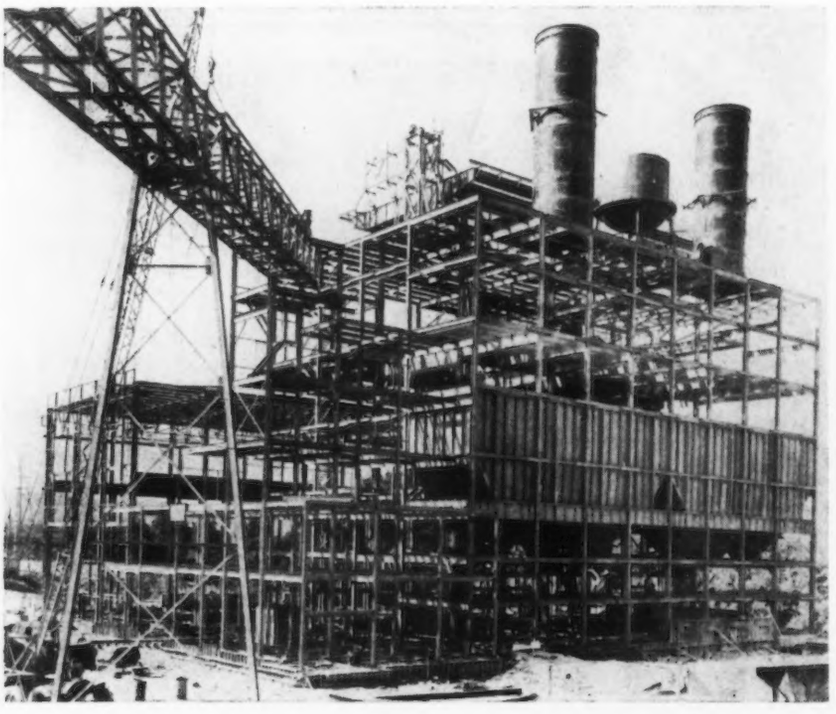
Portland, Ore.

• • • **A new building** to house the Los Angeles area retail sales and service organization for Hyster industrial trucks was opened recently at 5301 Pacific Blvd., Huntington Park, according to Ray Ronald, western division sales manager of the Hyster Co., Portland, Ore.

Operations are under the management of L. W. (Jack) Barclay. Sales personnel includes: Harold Berg, Warren Burman, Victor Hunt, and Donald Imhoff.

The organization is exclusive distributor of Hyster materials handling equipment such as lift trucks, straddle trucks, and mobile cranes in 13 southern California counties.

EMBRYO STAGE: *The 2350 tons of steel for the new Alabama Power Co. plant at Gadsden have been fabricated by the Ingalls Iron Works Co. of Birmingham. This plant is being constructed to meet the needs for power in the Gadsden area. It is in line with the long range plan for expansion of the Southern Co. which is made up of the Georgia Power Co., Alabama Power Co., Gulf Power Co. and the Mississippi Power Co.*



McLouth Steel Corp. Taps the First Heat From Its New Plant

Detroit

• • • **McLouth Steel** Corp., Trenton, Mich., poured its first heat of steel in its new plant last week.

The first McLouth heat was made in a 60-ton electric furnace recently brought from Indiana Harbor and reassembled here. Initial production was about 50 tons, it has been learned. A second furnace, scheduled to go into operation during the next 2 weeks, also saw previous service at the Indiana Harbor plant of Youngstown Sheet and Tube Co.

McLouth has already erected a portion of its melt shop. Structural work is said to be progressing rapidly on that part of the building which will house two additional electric furnaces.

Meanwhile, construction work is proceeding for the pouring floor, blooming mill, soaking pits and run-out tables. When the plant is completed about May 15, it is expected to have a capacity of 36,000 tons per month.

The new McLouth operation has been financed jointly by Reconstruction Finance Corp. and several of its prominent automotive customers.

Building Materials Up

Washington

• • • **Production of** building materials for the first 10 months of 1948 was 5.5 pct higher than for 1947, the highest in 33 years of recording such output.

In October, only three of 20 materials included in the Bureau of Labor index showed a decrease. These were structural steel, mechanical stokers, and hardwood flooring.

Other metal materials, including nails, cast iron radiation, soil pipe and rigid steel conduit showed substantial increases.

Seventh Foundry School

Tuscaloosa, Ala.

• • • **The University** of Alabama has been designated the seventh Foundry Educational Foundation School and will serve the foundry industry of the Southeast.

The foundry program will be set up in the college of engineering and will be directed by Prof. E. C. Wright, head of the metallurgical engineering department.

Dr. James T. MacKenzie, technical director of the American Cast Iron Pipe Co., Birmingham, has been appointed chairman of the Alabama advisory committee.

Walkout Over Discharge

Cleveland

• • • **Production** of automobile frames at Midland Steel Products Co. was halted Jan. 11 by a walkout of 1800 employees in protest, according to officials of Local 486, United Automobile Workers (CIO), against the company's discharge of two union leaders and the sending home of 175 workers.

Forms New Plate Company

Chicago

• • • **A new plate** and metal finishing company, Cover-Rite, Inc., has been organized here with plant and offices at 1714 W. Division St. A. L. Pietrowicz, formerly with Chicago Metal Plating Co., is president of the new firm. Other officers are Robert E. Driscoll, vice-president, and James W. Fogarty, secretary-treasurer.

GM Holds First Complete Postwar Show

New York

• • • **General Motors** opened its first complete postwar automobile show here at the Waldorf Astoria Hotel recently. The theme and title is "Transportation Unlimited" and is scheduled to run through Jan. 27.

All of the 1949 GM models are on display. These include the Chevrolet, Pontiac, Oldsmobile, Buick and Cadillac. Of this group, the Chevrolet and Pontiac models have been unveiled to the public for the first time.

Visitors at the show are getting a view of the varied display of research, styling and engineering operations which have led to the advancements of recent years in motor car building such as automatic transmissions, high compression engines with better fuel economy, better chassis-wheel suspension and general safety features.

In addition to an extensive presentation of how car design originates and is carried through to completion, one section is devoted to engineering practices and developments which help production units and another to long-range explorations.

DOES IT SMOKE: *The man above is not a firebug trying to burn up a car at the Waldorf Astoria. He's a Fisher Body engineer applying a smoke test to a 1949 model automobile. The machine at the upper left creates a vacuum inside the car and the engineer quickly determines if there is an air leak by passing the smoke torch around door and window openings.*

$100 a Month Pay Is Assured by Weirton's Retirement Program

Weirton, W. Va.

• • • **A minimum** retirement income of $100 a month is now guaranteed most Weirton Steel employees who participate in the company's retirement plan. This was disclosed last week by Thomas A. Millsop, president, Weirton Steel Co., and Edward A. Ross, president, Weirton Independent Union, in announcing an agreement upon which they have been working for 6 months.

Employees eligible under the new program who do not participate in the National Steel retirement annuity plan will also receive benefits under the new program. But they won't receive $100 a month because that figure is arrived at by combining: (1) Social Security benefits: (2) monthly payments under the retirement annuity plan; and (3) a company contribution equal to the difference between the total of (1) and (2) and $100.

Where an employee's retirement annuity plus Social Security adds up to more than $100 a month the company makes no contribution. It is when these two checks don't equal $100 that the company contribution counts. In some cases this will amount to as much as $45 a month.

In addition to the production and maintenance workers represented by the union, benefits will apply to office workers and all other types of employees who are not members of the union. More than 700 people are now eligible for payments as a result of this agreement. It is effective as of Jan. 1, 1949.

Eligibility requirements under the new program are: (a) the employee must be 65; (b) his income from (1) and (2) above totals less than $100; and (c) he must have 15 years of credited service. (Time in the armed forces or time lost through sickness or layoff is included as working time in figuring credited service.)

The National Steel Retirement annuity plan was set up in 1941. It then applied only to employees whose income exceeded the $3000 maximum covered by federal Social Security. In 1944 the plan was amended so that all employees aged 30 or more with 5 years of service were eligible regardless of their income bracket. Membership in this plan is voluntary but if an employee wants to join he must do so when he is eligible or lose the privilege of joining later.

Under the retirement annuity plan regular monthly contributions are made by the employee and the company under a group annuity contract underwritten by the Equitable Life Assurance Society of the U. S.

An employee who drops the retirement annuity plan or leaves the company before 5 years gets back his contribution plus 2 pct interest. If he leaves after 5 years he may leave his contribution in the fund thereby holding for his future benefit the company's contribution to his account. Normal retirement age is 65. Retirement at 55 is possible with lower benefits. If the company asks an emlpoyee to retire after he has reached 60 he receives the same monthly annuity he would normally receive at age 65.

Geiger Counters On Mass Production Basis

Pittsburgh

• • • **A horrible thought** but inevitable—mass production of Geiger counters is under way. Perhaps demand will only be on the order of the tens of thousands needed to work with radioactive isotopes in research laboratories and in industry. Or perhaps they will become standard equipment for air raid wardens.

Either way, they will be available. Westinghouse Electric Corp. reports that the hand-made Geiger counter will be replaced by a mass produced device. Its engineers are developing techniques for economical precision manufacture of tubes, instruments and power supplies for Geiger counters. Production will be counted in tens of thousands like radio receiver parts.

Gulf Oil Expands in Texas

Pittsburgh

• • • **A $19 million** expansion program has been completed by Gulf Oil Corp. at its Port Arthur, Tex., refinery. The expansion was undertaken primarily to increase the efficiency and flexibility of the refinery —nation's largest in point of production—officials said.

The new units will enable the conversion of a greater portion of the incoming crude either to fuel oil or to gasoline as required to supply needs at any particular period. Potentially, Gulf officials stated, the new installations could increase the refinery's crude charging capacity by 66,000 barrels a day. At present, however, the desulphurization unit and polyform unit will be operated in conjunction to produce a higher quality of gasoline from straight run gasoline, naphtha fractions and light hydrocarbons.

Coming Events

Jan. 24-25 **Industrial Furnace Manufacturers Assn.**, mid-winter meeting, Cleveland.
Jan. 24-28 **American Society of Heating & Ventilating Engineers**, annual meeting, Chicago.
Feb. 9-10 **Steel Founders Society of America**, annual meeting, Chicago.
Feb. 14-17 **American Institute of Mining & Metallurgical Engineers**, annual meeting, San Francisco.
Feb. 23-25 **American Concrete Institute**, annual meeting, New York.
Feb. 28-Mar. 4 **American Society for Testing Materials**, spring meeting, Chicago.
Mar. 8-10 **Society of Automotive Engineers**, passenger car, body and production meeting, Detroit.
Apr. 5-6 **Metal Powder Assn.**, annual meeting, Chicago.
Apr. 8-9 **Lead Industries Assn.**, annual meeting, Chicago.
Apr. 11-14 **National Assn. of Corrosion Engineers**, annual conference and exhibition, Cincinnati.
Apr. 14-15 **Magnesium Assn.**, annual meeting, Chicago.
Apr. 18-20 **Midwest Power Conference**, Chicago.
Apr. 18-20 **American Institute of Mining & Metallurgical Engineers**, annual Conference of Openhearth Steel Committee, Chicago.

Continued High Employment Seen for 1949

Cleveland

• • • **Continuing** high employment into 1949, based on report from employers in steel, automobile and other basic industries in the Ohio, Michigan and Kentucky region, was predicted this week by J. Kimball Johnson, regional Federal Security Agency Director.

J. K. Johnson

"On the other hand, there is already some indication that individual industries will go through an adjustment period during the coming year," he added.

"Reports from employment services in several communities have already reflected this in some unexpected increases in applications for work and unemployment compensation resulting from lay-offs in plants producing fractional horsepower motors, home appliances and other items where supply appears to be catching up with demand," Mr. Johnson pointed out.

Another segment of industry which appears to be catching up with demand are the job foundries, he said, which has accounted for some employment declines in Michigan, but the continuing demand for automobiles has resulted in peak peacetime employment in that state.

"Michigan foundries and machine builders have come into national competition in supplying the automobile industry; hence some loss of orders resulting in lay-offs in Muskegon and Pontiac," he asserted.

During 1948, foundries and machine industries in Michigan reduced employment by 8800.

Mr. Johnson reported that while labor turnover in most industries has been high during the entire postwar period, 1948 registered some decline.

"This was noticeable in the iron and steel industry, where turnover has always been a major personnel problem. In Youngstown, reports from iron and steel employers showed a separation rate of 4.1 in October 1947, which was reduced to a rate varying from 2.9 to 3.2 during 1948."

Labor market analysts attribute the declining turnover rate to fewer job opportunities in other industries and a general stabilization of the work force during the past year.

"The Federal Reserve Board Index of total production averaged 191.5 pct of the 1935-1939 average in the first 11 months of 1948 and manufacturing output increased, according to the production index," he added.

Manufacturing in this three-state region consistently turned out more goods each of the first 11 months of 1948 than they did during the corresponding months of 1947.

Steel production centers in the tri-state region account for about 25 pct of the national production and labor market reports received from state employment services consistently showed record employment within the industry throughout the year. In the Youngstown area, as many as 35 pct of the steel workers have been working overtime in some of the establishments.

Demand for additional labor is expected to remain at a high level during the coming year, he emphasized.

"In fact, labor shortage is one of the major factors hampering further employment expansion in the industry throughout the region."

In a year-end statement based on similar U. S. Employment Service data in THE IRON AGE, Jan. 9, 1947, Mr. Johnson predicted that employers in the Ohio, Michigan and Kentucky region required further employment increases to meet production schedules, a statement amply borne out during 1947 and 1948.

During 1948, national employment reached a monthly average of 61.4 million workers, or 1,200,000 over the 1947 average.

GLASS MAN: *The convenient carrier in the foreground comes in handy to the workman who is shown installing safety window glass in an Oldsmobile body at the Lansing, Mich., plant of the Fisher Body Div. of General Motors.*

C F & I Breaks Record In Production and Safety

Pueblo, Colo.

• • • **For the second** consecutive year, Colorado Fuel & Iron has broken production records. Their shipment of the millionth ton of steel product occurred 2 weeks earlier this year than last. A new high in steel shipped was made last year with 1,069,809 net tons. The wire mill broke a production record of 36 years. An all time all high production was attained in the blast furnace department with four furnaces operating at rated capacity. They broke the coke record too. Nearly a million tons of coke was produced in Pueblo.

Despite these record production tonnages the plant experienced the best safety year they have ever had. High spot of the year was a period when Pueblo put in 1½ million man hours without a lost time injury.

Considerable improvement in facilities were made. New equipment and production facilities were added at the rail mill in the form of new ingot handling equipment. In the openhearth department archless door frames and water cooled doors as well as two new dolomite machines were added. Extensive modernization was done in the wire mill. A major new construction took place at the rod mill when on June 14 ground was broken for an entirely new mill. This mill, scheduled for completion early this year, will increase wire production by at least 36 pct.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter	*19,855,413*	*95.5*	*1,047,000*	*80.6*	*1,118,702*	*83.4*	*22,021,115*	*94.0*	*1,693,932*	*13.00*
April	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd Quarter	*18,921,336*	*90.9*	*897,461*	*69.0*	*1,227,366*	*91.4*	*21,046,163*	*89.7*	*1,617,691*	*13.01*
1st 6 months	*38,776,749*	*93.2*	*1,944,461*	*74.8*	*2,346,068*	*87.4*	*43,067,278*	*91.9*	*1,655,797*	*26.01*
July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
August	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
September	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
3rd Quarter	*19,569,806*	*93.2*	*1,083,349*	*82.5*	*1,267,087*	*93.5*	*21,920,242*	*92.6*	*1,669,478*	*13.13*
9 months	*58,346,555*	*93.2*	*3,027,810*	*77.4*	*3,613,155*	*89.4*	*64,987,520*	*92.1*	*1,660,386*	*39.14*
October	7,118,299	100.5	409,545	92.5	459,268	100.4	7,987,112	100.0	1,802,960	4.43
* November	6,920,747	100.9	411,049	95.9	446,816	100.9	7,778,612	100.6	1,813,196	4.29
† December	6,916,974	97.9	393,609	89.1	445,256	97.6	7,755,839	97.4	1,754,715	4.42
† *4th Quarter*	*20,956,020*	*99.7*	*1,214,203*	*92.4*	*1,351,340*	*99.6*	*23,521,563*	*99.3*	*1,790,073*	*13.14*
† *2nd 6 months*	*40,525,826*	*96.5*	*2,297,552*	*87.5*	*2,618,427*	*96.6*	*45,441,805*	*96.0*	*1,729,798*	*26.27*
† Total	79,302,575	94.8	4,242,013	81.2	4,964,495	92.0	88,509,083	93.9	1,692,982	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,550,058	95.2	384,096	87.7	288,458	66.9	7,222,612	93.2	1,630,386	4.43
February	5,835,018	93.9	314,912	79.6	280,471	72.0	6,430,401	91.9	1,607,600	4.00
March	6,619,641	96.2	378,893	86.5	318,440	73.8	7,316,974	94.4	1,651,687	4.43
1st Quarter	*19,004,717*	*95.1*	*1,077,901*	*84.8*	*887,369*	*70.9*	*20,969,987*	*93.2*	*1,630,637*	*12.86*
April	6,365,670	95.5	375,675	88.6	310,497	74.3	7,051,842	93.9	1,643,786	4.29
May	6,640,004	96.5	372,878	85.2	326,132	75.6	7,339,014	94.7	1,656,662	4.43
June	6,317,705	94.8	351,247	82.8	308,762	73.9	6,977,714	92.9	1,626,507	4.29
2nd Quarter	*19,323,379*	*95.6*	*1,099,800*	*85.5*	*945,391*	*74.6*	*21,368,570*	*93.9*	*1,642,473*	*13.01*
1st 6 Months	*38,328,096*	*95.4*	*2,177,701*	*85.2*	*1,832,760*	*72.8*	*42,338,557*	*93.5*	*1,636,589*	*25.87*
July	6,033,512	87.9	256,125	58.6	289,048	67.2	6,578,685	85.1	1,488,390	4.42
August	6,329,497	92.0	346,033	79.0	315,622	73.2	6,991,152	90.2	1,578,138	4.43
September	6,152,348	92.5	334,425	79.0	310,684	74.6	6,797,457	90.8	1,588,191	4.28
3rd Quarter	*18,515,357*	*90.8*	*936,583*	*72.2*	*915,354*	*71.6*	*20,367,294*	*88.6*	*1,551,203*	*13.13*
9 Months	*56,843,453*	*93.8*	*3,114,284*	*80.8*	*2,748,114*	*72.4*	*62,705,851*	*91.9*	*1,607,842*	*39.00*
October	6,831,984	99.3	384,272	87.8	353,896	82.1	7,570,152	97.7	1,708,838	4.43
November	6,543,390	98.2	360,620	85.0	338,417	81.0	7,242,427	96.5	1,688,211	4.29
December	6,654,966	96.9	373,367	85.5	347,308	80.7	7,375,641	95.4	1,668,697	4.42
4th Quarter	*20,030,340*	*98.1*	*1,118,259*	*86.1*	*1,039,621*	*81.3*	*22,188,220*	*96.5*	*1,688,601*	*13.14*
2nd 6 months	*38,545,697*	*94.4*	*2,054,842*	*79.1*	*1,954,975*	*76.4*	*42,555,514*	*92.6*	*1,619,928*	*26.27*
Total	*76,873,793*	*94.9*	*4,232,543*	*82.1*	*3,787,735*	*74.6*	*84,894,071*	*93.0*	*1,628,195*	*52.14*

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

WAA Offers War Surplus Steel Foundry For Sale

Chicago

• • • **War Assets** Administration in Chicago is offering for sale a completely equipped war surplus steel foundry in East Chicago, Ind. This is an unscrambled facility adaptable for many types of heavy industry, including the production of steel ingots. The plant was built in 1942 at a cost to the government of $5,768,000.

Operated during the war by Continental Foundry & Machine Co., the plant is located at Railroad Ave. and 145th St. It consists of approximately 8.1 acres of land, and a main foundry building with a floor area of 254,000 sq ft. An adjoining two story building and basement office and service building contain 28,640 sq ft of floor space.

The foundry is equipped with three 40-ton openhearth furnaces and auxiliary equipment. The plant is served by the Indiana Harbor Belt Line which connects with the New York Central, the Pennsylvania and other railroads within the Chicago switching district. Sealed bids for the purchase of the property will be accepted by the WAA Real Property office, Navy Pier, Chicago, until 2 p.m. Jan. 21.

Sale of the foundry is subject to the provisions of the National Security Clause as executed by Secretary of National Defense. Under this clause the federal government retains the right to utilize the facilities for war production, under contract, in event of a national emergency.

Anti-Reds Win UE Vote

Pittsburgh

• • • **Control of the** big CIO union representing 16,500 workers at Westinghouse East Pittsburgh Works has just been returned to men pledged to purge Communists from their union. The change came after a one-year fight climaxed by an election in which 85 pct of the membership Local 601, CIO United Electrical, Radio and Machine Workers, turned out to vote.

The UE Rank and File candidates won by uniting in opposition to the left wingers. Under the chairmanship of a 24-year-old maintenance worker, James Fitzpatrick, they consolidated various non-communist groups that had previously split opposition to the left wing.

The count made last week showed 13,900 voting out of a membership of 16,500.

Raises Truck Prices

Detroit

• • • **Chevrolet Div.** of General Motors Corp. has announced boosts of $50 to $90 in its 1949 truck prices. The price increases do not apply to the division's heavy-duty, 2-ton trucks. W. F. Armstrong, general manager, said the division will begin manufacturing its 1949 line of trucks and commercial cars this week.

Reports Steel Increase

Detroit

• • • **Steel mill** sales increased from a proportion of 35 pct to 47 pct of the business volume of International Detrola Corp. for the fiscal year ended Oct. 31, 1948. Total sales for 1948 were $69,314,500 compared with $71,682,200.

During the year 1948, International Detrola inaugurated a construction program to expand the company's steel mill facilities from 413,100 tons of ingots per year to 780,000 tons per year. The construction program is expected to be completed early in 1949.

Stainless Strip Mill Starts Production

Carnegie, Pa.

• • • **Coming into** production this month is a new 20-in. continuous hot strip mill at the Superior Steel Corp. plant here. It will produce stainless steel strip in widths from 4 to 18 in., as thin as 0.065 in. Clad steel and carbon steel will be rolled from 4 to 20 in. wide in thicknesses down to 0.040 in. Rated capacity of the mill is 10,000 tons of strip monthly.

In giving details on the new mill, E. J. Reardon, operating vice-president, explained that it would replace two older 10 and 14-in. mills. He said it was installed to get better surface finish and to improve structure by additional hot working. Equipment includes a 3-high 29x40-in. roughing stand, upcut shear, five 4-high finishing stands, collapsible mandrel type coiler and a continuous overhead coil conveyor.

Superior Steel Corp.'s New Strip Mill

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

5270 **Tons,** Kansas City, southwest traffic way to American Bridge Co., Pittsburgh.

2400 **Tons,** Hastings, Minn., Mississippi River bridge reported as 3400 tons awarded to Allied Structural Steel. The tonnage is 2400 tons and actually went to Clinton Bridge Co., Clinton, Iowa.

434 **Tons,** Plaquemine, La., bridge for Louisiana Highway Dept., to Virginia Bridge Co., Birmingham.

425 **Tons,** Bayonne, N. J., boiler house for Standard Oil Co. of N. J., through Day & Zimmerman, Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

315 **Tons,** Brown Co., Ill., highway bridge Section 18F to Clinton Bridge Co., Clinton, Iowa.

275 **Tons,** Bronx, N. Y. Mt. Carmel School, Bathgate Ave. & East 188th St. to Grand Iron Works, New York.

235 **Tons,** Philadelphia, school at 58th and Walnut Sts., through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

195 **Tons,** Hanover, Pa., through Atlas Mfg. Co., York, Pa., to Bethlehem Steel Co., Inc., Bethlehem.

160 **Tons,** Philadelphia, platform beams at 30th St. Station, through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

160 **Tons,** Philadelphia, garage and shop for Sinclair Refining Co., to Bethlehem Fabricators, Inc., Bethlehem.

150 **Tons,** Granada, Colo., state highway bridge to E. Burkhardt & Sons Iron & Wire Works, Denver.

140 **Tons,** McCoupin Co., Ill., state highway bridge Section 18F to Midland Structural Steel Co., Cicero, Ill.

125 **Tons,** Hendricks Co., Ind., state highway bridge Section 3091 to American Bridge Co., Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

3000 **Tons,** New York, building for Uris Bros. Co., New York.

1840 **Tons,** Middlesex Co., N. J., bridge and approaches for Route 4 parkway, Section 1-B, due Jan. 27.

1800 **Tons,** Horum, Mont., Hungry Horse Dam Spec. 2504 U. S. Bureau of Reclamation.

517 **Tons,** Multnomah Co., Ore., bridge over Willamette Slough on Gillihan Rd., Oregon State Highway Commission, Portland, bids to Jan. 24.

500 **Tons,** Washington, D. C., general accounting building for U. S. Government, due Jan. 26.

500 **Tons,** Chicago, 1949 bridge building program for Great Northern Railroad previously reported, has been abandoned.

450 **Tons,** Chicago service and administration building for Chicago Transit Authority.

390 **Tons,** Lorado, Tex., power station, Sargent & Lundy, contractors, Chicago.

380 **Tons,** White Co., Ill., state highway bridge Section 4-2F has been abandoned.

370 **Tons,** Multnomah Co., Ore., railroad-highway separation, Oregon State Highway Commission, Portland, bids to Jan. 25.

325 **Tons,** Franklin Park, Ill., industrial building for Bruner & Lay, Inc., Allied Structural Steel, Chicago, low bidder.

320 **Tons,** Bergen Co., N. J., bridges, New Jersey Dept. of Highways, due Jan. 30.

200 **Tons,** Clearfield, Pa., hosptial, due Jan. 27.

175 **Tons,** White Co., Ill., state highway bridge Section 1F has been abandoned.

100 **Tons,** Wilmington, Del., Veterans' Administration, Consolidated Quarters Apartment Building, to be rebid Jan. 27.

• • • **Reinforcing bar awards** this week included the following:

435 **Tons,** Beloit, Wis., high school building to Sherry Richards Co., contractors, Chicago.

280 **Tons,** Santa Barbara, Calif., tuberculosis unit, Santa Barbara Co. General Hospital, through H. M. Hodges, Los Angeles, to Soule Steel Co., Los Angeles.

200 **Tons,** Harvey, Ill., gymnasium and Auditorium building to Chas. B. Johnson & Son, Chicago.

190 **Tons,** Northport, Wash., Columbia River bridge, through General Construction Co., Seattle, to Bethlehem Steel Co., Inc.

150 **Tons,** Boston, new warehouse for Westinghouse Electric Supply Co. through Rugo Construction Co., Boston, to Concrete Steel Co., Boston.

• • • **Reinforcing bar inquiries** this week included the following:

645 **Tons,** Los Angeles, undercrossing on Hollywood Parkway at Heliotrope Drive, California Div. of Highways, Los Angeles, bids to Feb. 10.

290 **Tons,** Multnomah Co., Ore., bridge over Willamette Slough on Gillihan Road, Oregon State Highway Commission, Portland, bids to Jan. 24.

150 **Tons,** Kankakee, Ill., high school building reported awarded to J. L. Simmons Co. last week, has been rejected. Project will be readvertised.

105 **Tons,** Chicago, service and administration building for Chicago Transit Authority.

105 **Tons,** Multnomah Co., Ore., railroad-highway separation, Oregon State Highway Commission, Portland, bids to Jan. 25.

(Continued on page 114)

50 YEARS AGO

THE IRON AGE, *January 19, 1899*

• Western Electric is still expanding. Their new plant at Allentown, Pa., is an artist's dream. It is the most recent of the many that have been added since THE IRON AGE reported, "The growth of the business of Western Electric Co., Chicago, is almost phenomenal. They are adding to their possessions, in the block bounded by Clinton, Jefferson and Congress Streets and Jefferson Place, building after building, each one of which would make in itself a very respectable manufacturing establishment."

• **"A movement is afoot among Western railroads to make a reduction in freight rates on pig iron, billets and articles of iron and steel manufacture for shipment to the seaboard for export." This was only one of the moves that helped the steel industry get a toehold in the world trade market as a result of its ability to lower prices to a competitive level.**

• "The accumulation of capital which is becoming evident in this country is in excess of opportunities for its profitable investment along accustomed lines and may serve to direct renewed attention to the field of shipbuilding which was practically deserted during the most active period of our railway development." Three weeks previously a bill had been introduced in Congress to finance development of a substantial merchant marine.

• **One steel official quipped that, "there are practically only two advantages in overtime work—namely, getting the job done on time and thereby fulfilling the terms of the contract and keeping the good will of a customer."**

• It happens today and it did happen then, too. Following is a telegraph THE IRON AGE received from the Bellaire Steel Co. of Bellaire, Ohio: "In your next issue will you please contradict the report that the property or stock of this company has been sold. There is no truth to the rumor." In the following issue our Chicago correspondent reported: "The American Tinplate Co. denies that they have bought the Bellaire Steel Co. or that they are negotiating for the purchase of that or any other steel works. They say their business is to manufacture tinplate and they propose to stick to it."

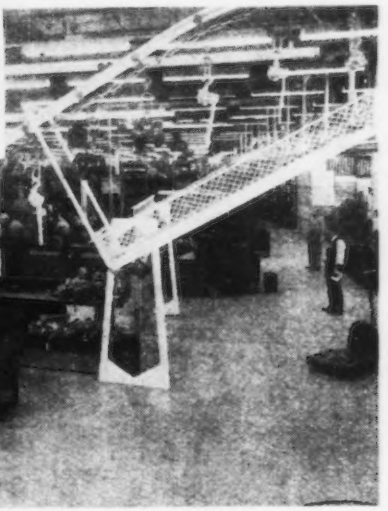
NEWS OF INDUSTRY

New Plant Is Designed To Benefit From Material Handling Economies

o o o

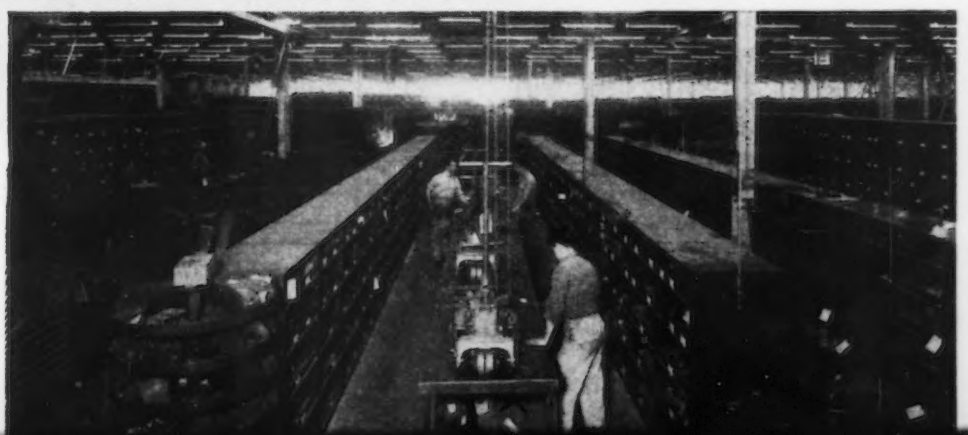
ABOVE: *The Yale & Towne Mfg. Co. plant on Roosevelt Boulevard, Philadelphia was designed and built around a materials handling system that provides production economies that are impossible in poorly laid out plants.*

LEFT: *Workmen are shown putting the finishing touches to work-saver motorized lift trucks on assembly benches.*



RIGHT: *An automatic monorail conveyor system is used in the progressive assembly and finishing of hand chain hoists and Pul-Lifts. This system can run through an entire shop providing an economical method of moving material from one place to another in a steady flow.*

LEFT: *Here are the assembly benches that are used for making the Midget King electric hoists. Standardization of operations is the basis on which plans for this shop were drawn up to obtain maximum production efficiency.*



RIGHT: *Parts bins are located so as to save motions in reaching for parts to be assembled on hand lift trucks. Bins are refilled from the rear by parts clerks thus releasing full time of the skilled worker for assembly.*

(*Continued from page* 112)

• • • **Steel piling awards** this week included the following:

200 Tons, Northport, Wash., Columbia River bridge, through General Construction Co., Seattle, to Bethlehem Steel Co., Inc.

• • • **Railroad car awards** and inquiries this week included the following:

Santa Fe R. R. requirements for rails for 1949 recently placed amounts to 75,900 net tons; Colorado Fuel & Iron Co. got 42,000, Carnegie-Illinois Steel Corp., 27,900 and Inland Steel Co., 6000. New York Central has ordered 500 flat cars from General American Transportation Corp. This same company has received an order for 75 covered hopper sars from Chicago Great Western R. R. and also another order of 35 covered hoppers from Wisconsin Central R. R. Bethlehem Steel Co. has received an order for 500 50-ton hoppers from the Reading Co. Pullman Standard Car Mfg. Co. has received an order for 30 50-ton box cars from Chicago, Indianapolis & Louisville R. R. Greenville Steel Car Co. has received an order for 125 70-ton hopper cars from Detroit & Toledo Shore Line R. R. The New York Central R. R. has ordered 5363 freight cars as follows: 500 55-ton hoppers from American Car & Foundry Co.; 400 70-ton gondolas from Bethlehem Steel Co., Inc.; 2000 55-ton hoppers from despatch shops; 500 70-ton flat cars from General American Transportation Corp.; 600 70-ton gondolas from Greenville Steel Car Co.; 650 55-ton hoppers from Pressed Steel Car Co.; 200 70-ton covered hoppers and 500 70-ton gondolas from Pullman Standard Car Mfg. Co. The first of 500 tank cars was completed last week at the Whiting Shops of the Union Tank Car Co. This is the first car built in a program which will run 65 cars monthly. Tanks are being supplied by Struthers-Wells Corp., Graver Tank & Mfg. Co., and General American Transportation Corp.

Record Steel Output Is Reported 88,509,083 Tons

New York

• • • **The first official** tabulation of the record peacetime steel production in 1948 places the year's total at 88,509,083 net tons of ingots and steel for castings, according to the American Iron and Steel Institute. (THE IRON AGE had estimated output for the year at 88.5 million tons.)

That was far more steel than ever made before in a peacetime year and was only a few days output lower than the alltime record of 89,600,000 tons produced in 1944.

During the second half of 1948 more steel was made than in any other 6 months in history. The total for the second half was 45,441,805 tons, compared with 43,067,278 tons in the first 6 months of the year.

To produce the record tonnage of 1948, steel furnaces were operated at an average rate of 93.9 pct of capacity. The first peacetime year in which average operations exceeded the 90 pct level was 1947.

Increase In U.S. Iron Ore Prices Brightens Outlook For Quebec-Labrador

Quebec

• • • **People connected** with the Quebec-Labrador iron ore developments feel better these days. The recent $1.00 a ton increase in iron ore in the United States is the reason. When ore starts coming down to Seven Islands there will be more profit than under former quotations.

But Hollinger-Hanna people still believe that the success of the venture depends on the Seaway project being completed. Ore could be shipped to the states by rail from Montreal but the profit per ton would not be large enough to make anyone happy.

In recent weeks the amount of iron ore proven in the Hollinger controlled Quebec-Labrador fields (THE IRON AGE, Nov. 4, 1948, p. 155) has been formally put at around 325 million tons. Samples at M. A. Hanna Co., Cleveland, have been completely checked and analyzed. The amount of iron necessary has been proven. The only thing that remains is the method of financing and a start in railroad building.

It is doubtful if the financial arrangements will be announced and the railroad officially started until definite commitments have been made on ore requirements. It is known that British interests have made definite statements that they would participate to the extent of 2 million tons of ore a year. But Hollinger-Hanna wants to be sure of a 10 million ton outlet for the first few years. When these commitments are obtained from the states the whole project will start booming along.

The repetition of the 300 million ton figure has given some quarters an erroneous impression that this is the maximum amount of high grade iron ore in the Hollinger concessions. Nothing could be further from the truth. The new 325 million ton figure covers only the area which was staked out for exploration to determine if the project was worth while.

Even in the explored area there is plenty of ground that was not covered and which probably contains large supplies of high grade ore. No one in the interested companies will say what they think the entire concession will disclose. But at least a billion tons cannot be far away. One has only to remember that a short time ago the present proven tonnage would have been called fantastic.

It is understood that the Hollinger controlled proven area is about 12 miles wide and 90 miles long. Contrasted with this is the concession itself which is said to be about 40 miles wide and about 225 miles long. There could be plenty of surprises when the territory is completely explored—after the railroad is in and the camp set up.

In recent months Hollinger people have been gratified to find that their estimate of a cost of ½¢ per ton-mile for freighting the ore from Burnt Creek to Seven Islands was correct. Some outsiders had believed that this was a low figure. However, the Pennsylvania R.R. and a large Canadian road have checked the company figures and are in agreement that the ½¢ per ton-mile is correct.

It has also been reported in traffic circles that the Pennsylvania R.R. has made a complete survey on the probable cost of ore by rail to the Pittsburgh district. Before the price of ore was advanced in the states the chance for a profit by all-rail transport from Montreal was anything but promising—it was said to allow only about 25¢ a ton profit. Now that iron ore prices are higher this survey will have to be revised. Furthermore, it is expected that the Seaway will be completed. If that becomes a fact Quebec-Labrador iron ore will be in a good position to compete with taconite from the states and ore from Venezuela.

The main obstacle in the way of formally and definitely starting the Hollinger iron ore project by building the railroad is the need for commitments from steel companies that they will take a stipulated amount of ore when it starts moving down from Cain land.

More Credit Approved For Integrated Plant At Concepcion, Chile

Washington

• • • **The Export-Import Bank** has approved an additional credit of $20 million to help finance the new $83 million integrated steel mill now being erected by the Fomento Corp. at Concepcion, Chile.

The new loan supplements a 1945 credit of $28 million. Bank officials said rising costs of materials and services in the United States were responsible for the additional loan. It is now estimated that about $60 million will be earmarked for purchase of U. S. materials, equipment and services.

Robert Veragara, Fomento Corp. representative, said it was planned to have the pipe mill and the sheet and tinplate mill in operation this year, and added that there was "an excellent possibility" that the blast furnace may be blown in at the end of this year.

The entire plant, with a capacity of 250,000 tons of steel products, "should be completed during the first half of 1950," Mr. Vergara said.

The Bethlehem Chile Iron Mines will supply iron ore for the new mill from Tofo and Romeral, Mr. Vergara said, under terms of an agreement which will assure the mill an iron ore supply for the next 20 years. Coal is to be purchased from the Lota and Schwager companies. Limestone is to be obtained from deposits owned by the company, and power is to be supplied by the 85,000-kw Abanico plant, another project in which the Export-Import Bank is interested.

The integrated mill, when completed, will include a deep-water pier and other raw material-handling facilities, retort-type coke oven installation with byproduct plant, blast furnace, bessemer and open-hearth steel-making facilities, blooming mill, and finishing mills.

The blast furnace will have an annual capacity of 203,000 metric tons, the steel-making facilities are designed to produce 236,400 metric tons of ingots, and the mills 158,600 metric tons of finished products. The bank said this output would be sufficient to supply virtually the entire Chilean market, except for certain specialized products.

Spring Months Called Crucial Period in '49 Costs of Construction

New York

• • • **The spring months** will be the crucial period that will determine whether construction costs will stabilize or increase during 1949, Guy B. Panero, head of a New York engineering firm of his name, said in a statement analyzing the construction outlook for the next 12 months.

There is little reason to believe that costs will recede this year, Mr. Panero said. "However, there is better than an even chance that the industry will attain a degree of stabilization that will at least enable builders to predict costs with relative accuracy. We will know for certain the cost trend by spring."

Mr. Panero cited housing construction as certain to go ahead regardless of cost "although insurance companies, banks and other investors will probably hold some of their projects in abeyance in the face of increased costs." These delayed projects, according to Mr. Panero, would account for only a small percentage of the estimated 35 pct of the total construction that will be accounted for by housing.

"The principal reason for a firm market in housing," Mr. Panero said, "is that the Administration has committeed itself to relieving the present shortages. Although methods for accomplishing this have not yet been determined, it is sound to assume that a large-scale program will go forward during the coming year."

The New York engineer said that another certain source of construction will come from all levels of government. Local and state governments, as well as the Federal government, are no longer able to delay their construction programs for such facilities as schools, hospitals, power, water and sewage disposal plants. Many projects of this type were conceived before the war and have been postponed year after year.

Mr. Panero said there are still some industrial firms which must continue to expand or modernize in spite of costs. However, he admitted, industry in general is becoming more and more cost conscious.

Harry Stark Retires After Half a Century With J&L Steel Corp.

Pittsburgh

• • • **Harry D. Stark** retired last week as assistant to the vice-president in charge of operations, Jones & Laughlin Steel Corp., after 49 years with the company. For almost half this time he was first, assistant general superintendent, and then general superintendent of J&L's big Pittsburgh Works.

Harry D. Stark

For years his was one of a very few fists that thumped J&L conference tables with demands for expansion and improvements. For years he had carried the torch for a better balance in J&L's steelmaking facilities. He wanted more openhearths at the Pittsburgh Works. Usually the reply was "We haven't the room," sometimes, "We haven't the money." Last year the board of directors authorized construction at Pittsburgh of six new openhearths with an annual capacity of 800,000 tons. They still hadn't the room, but they'd buy the land.

Harry Stark has been known for years as a hard boiled steel man in the best sense of that term. Yet those who worked with him say he never used profanity. Informed of a bad mill breakdown his strongest expletive was likely to be "Oh rats!" Before he left last week he walked through 20 floors of offices and more miles of mills to say farewell to his friends.

The continuous strip mill at J&L's Pittsburgh Works was one of Harry Stark's projects. Installed in 1936 it was among the first in the industry. He started his career with J&L as a draftsman at the age of 16. Later he served as superintendent of the machine shop, the steel works and the blooming mill departments. In August 1947 he left as head of the Pittsburgh Works to become assistant to the vice-president, operations.

Westinghouse Planning Output of 20 Pct More Appliances This Year

New York

• • • **Westinghouse Electric Corp.** plans to increase unit production of appliances an average of 20 pct this year. That's what Reese Mills, assistant general manager, Electric Appliance Div., told distributers of New York, New Jersey and 6 New England states at a meeting here last week.

Mr. Mills said the company will make the increase despite current conditions in the appliance market which require selling for the first time since the war. He added that only an unforseen shortage of steel supplies will force abandonment of the 20 pct increase goal.

Here is a breakdown of increases to be made in individual appliances: refrigerators, 30 pct; electric ranges, 15 pct; automatic washers, 12 pct; electric clothes driers, 90 pct; garbage disposal units, 80 pct; fans, 12 pct; roasters, 12 pct; vacuum cleaners, 12 pct; automatic irons, 27 pct; electric sheets, pop up toasters and comforters, each 50 pct and automatic food mixers, 100 pct.

Mr. Mills reported that the appliance division has adopted a 1949 advertising budget of more than $11 million. But he cautioned that that figure is not a fixed one and may be altered later in the year in accordance with any change in the merchandising situation.

U. S. Steel Export Co. Announces New Prices Showing Freight Rise

New York

• • • **Reflecting increases** in freight rates effective Jan. 11, 1949, U. S. Steel Export Co., U. S. Steel subsidiary, announced the following new prices covering principal carbon and alloy steel products with freight included to New York, Philadelphia or Baltimore.

These prices apply on carload lots and became effective with shipments made on and after 12:01 a.m., Jan. 11, 1949.

Prices are subject to seller's current list of extras and deductions, and conditions of sale.

All sales are subject to seller's price in effect at time of shipment.

CARBON-STEELS

Ingots:	
Rerolling Quality	$64.62 Net Ton
Forging Quality	65.62 Net Ton
Billets, Blooms and Slabs:	
Rerolling Quality	67.62 Net Ton
Forging Quality	76.62 Net Ton
Tube Rounds	
Rails:	
Standard, 61 lb and over	81.76 Net Ton
Light, 60 lb and under	86.47 Net Ton
Skelp	4.12 100 lb
Standard Structural Shapes	4.10 100 lb
C.B. Sections and Bearing Piles	4.05 100 lb
Plain Plates	4.25 100 lb
Floor Plates	5.40 100 lb
Hot-Rolled Bars	4.22 100 lb
Concrete Reinforcing Bars	4.22 100 lb
Fabricated Concrete Reinforcing Bars	5.10 100 lb
Tight Cooperage Hoops	4.47 100 lb
Steel Sheet Piling	4.90 100 lb
Hot-Rolled Strip	4.12 100 lb
Joint Bars for Standard Rails	5.52 100 lb
Tieplates	5.52 100 lb
Axles	6.05 100 lb
Sheets:	
H.R. 18 Ga. and Heavier	4.10 100 lb
Cold Rolled 15 Ga.	4.85 100 lb
Galvanized, Plain, 10 Ga.	5.25 100 lb
Galvanized, Corrugated, 10 Ga.	5.35 100 lb
Vitrenamel, 12 Ga.	5.25 100 lb
Electrical (Electrical Grade)	6.80 100 lb
Tinplate 107#:	
American Coke 1.25 lb Coating	8.88 Base Box
American Coke 1.50 lb Coating	9.13 Base Box
Ferrostan-Unassorted 0.25 lb Coating	7.83 Base Box
Ferrostan-Unassorted 0.50 lb Coating	8.08 Base Box
Ferrostan-Unassorted 0.75 lb Coating	8.38 Base Box
Special Coated Manufacturing Ternes-Unassorted	8.03 Base Box
Manufacturing Ternes-Unassorted	8.58 Base Box
Wire Products:	
Wire Rods	4.19 100 lb
Cold-Rolled Strip (.25 carbon and under)	4.89 100 lb
Bright Nail Wire	5.04 100 lb
Black Annealed Wire	5.65 100 lb
Galvanized Plain Wire	6.10 100 lb
Cold-Finished Bars	4.81 100 lb
Bright Wire Nails	6.28 100 lb
Bright Staples 9 Ga.	7.08 100 lb
Galvanized Staples 9 Ga.	8.03 100 lb
Barbed Wire	
Lyman 4 pt. 5 in.	6.23 80 Rod Spool
Glidden 2 pt. 4 in.	5.72 80 Rod Spool
American Standard Pipe T & C:	
Buttweld—2½ in. and 3 in.	
Black	41.6% discount
Galvanized	20.1% discount
Seamless—3½ in. to 6 in.	
Black	34.6% discount
Galvanized	12.6% discount
English Gas Tubes T & C	
Buttweld—2½ in. and 3 in.	
Black	40.5% discount
Galvanized	22.0% discount

ALLOY STEELS

Ingots—Forging Quality	$66.62 Net Ton
Billets, Blooms and Slabs, Forging Quality	78.62 Net Ton
H. R. Bars	4.60 100 lb
Plates	5.25 100 lb
Standard Structural Shapes	4.90 100 lb
H. R. Strip	5.97 100 lb
Cold-Finished Bars	5.54 100 lb

HIGH STRENGTH STEELS

CORTEN	
Plates	6.05 100 lb
Standard Structural Shapes	5.80 100 lb
C. B. Sections	5.80 100 lb
H. R. Sheets	5.80 100 lb
C. R. Sheets	6.90 100 lb
Galvanized Sheets	7.60 100 lb
H. R. Bars and Bar Shapes	5.95 100 lb
MANTEN	
Plates	5.30 100 lb
Standard Structural Shapes	5.05 100 lb
C. B. Sections	5.05 100 lb
H. R. Bars and Bar Shapes	5.00 100 lb
H. R. Sheets	4.95 100 lb
A-R STEELS	
Plates	5.40 100 lb
H. R. Bars	5.35 100 lb
H. R. Sheets	5.25 100 lb

Proposes Bill Prohibiting Mandatory F.O.B. Selling

Washington

• • • **Congressional hearings** on definite legislation (S. 236) declaring the legitimacy of delivered prices will get under way within the next two or three weeks.

This decision was announced this week by Senator Johnson, D., Colo., following introduction on the first legislative day of the 81st Congress of his bill. The unexpectedly prompt introduction of his legislative proposal, which, among other things prohibits mandatory f.o.b. mill selling, came as a surprise to members of the Federal Trade Commission and Congress alike.

Furthermore, the interest created in the business community by the starting of his bill through legislative channels is expected to overshadow in some degree the announcement of tentative agreement on policy between William Simon, counsel for Senator Johnson's Senate Trade Policies Subcommittee, and Robert Dawkins, FTC representative in the new policy settlement.

But Senator Johnson describes his bill as being "only a start at a solution to the problem." His view is that the time has come to pass from generalities to specific remedies. "Full hearings will be held by the subcommittee," he says, adding that "the bill is not in perfected form yet," and that "all interested parties will be given an opportunity to express their views on the subject."

"This bill is an attempt to eliminate confusion," he declared last week in addressing the Senate at the time he introduced his proposal. "I do not pretend that it is in perfected form, and constructive criticism is invited."

Gets ASME Appointment

Chicago

• • • **American Society** of Mechanical Engineers has appointed Frank S. G. Williams, of New York, eastern manager of Taylor Forge and Pipe Works, as chairman of ASA sectional committee B-31, which is responsible for the American standard code for pressure piping.

European Countries Send Training Missions Here

Washington

• • • **First of several** groups or "training missions" from England will arrive in the United States about Feb. 1 to visit and study American factory methods.

Purpose of the visits are to study assembly line and other production techniques, and labor-management relations with a view to improving British industrial productivity.

Norway has already sent one such delegation, comprised of seven trade unionists including representatives of the Aluminum and Metal Workers organizations. It arrived in the United States on Jan. 1 and conferred with officials of the CIO, AFL and the Railroad Brotherhoods before starting its factory visits.

Visits by the groups are largely the result of promotion by Administrator Paul Hoffman of ECA in the interest of increasing productivity of the Marshall Plan nations.

The British delegations will be sponsored by the Anglo-American Council on Productivity on which are four well known industrialists and four labor leaders.

1948 Construction Total Was 26 Pct Above 1947

Washington

• • • **With $1.4 billion** of new construction going into place in December, total construction value for 1948 amounted to $17.7 billion, the Office of Domestic Commerce reports. This is 26 pct above the nearly $14 billion for 1947.

The present outlook, Commerce predicts, is for 1949 new construction to run $1 billion more in 1949 or $18.7 billion.

Largest single factor in the 1948 overall increase was a rise in private residential building; it increased 30 pct over 1947 to a total of $7 billion. Wide increases in commercial types, churches, hospitals and other institutional work, and utilities construction were noted.

Private industrial building recorded a decline for most of the year, ending up 18 pct below the 1947 figures—$1.4 billion in 1948 compared with $1.7 billion in 1947.

NEW CONSTRUCTION ACTIVITY, CONTINENTAL UNITED STATES
(Millions of Dollars)

Type of Construction	12 Months 1949	12 Months 1947	Percent Change 12 Months 1948 From 12 Months 1947
Total new construction	17,666	13,977	+ 26
Total private	13,631	10,893	+ 16
Residential (excl. farm)	6,980	5,260	+ 33
Nonresidential building	3,615	3,131	+ 15
Industrial	1,391	1,702	− 18
Warehouses, office and loft buildings	354	216	+ 64
Stores, restaurants and garages	904	619	+ 46
Other nonresidential building	966	594	+ 63
Religious	239	118	+103
Educational	244	164	+ 49
Hospital and institutional	116	107	+ 8
Remaining types	367	205	+ 79
Farm construction	500	450	+ 11
Public utility	2,536	2,052	+ 24
Railroad	350	318	+ 10
Telephone and telegraph	676	510	+ 33
Other public utility	1,510	1,224	+ 23
Total public	4,035	3,084	+ 31
Residential	61	182	− 66
Nonresidential building	1,000	505	+ 98
Industrial	19	25	− 24
Educational	553	275	+101
Hospital and institutional	204	81	+152
Other nonresidential building	224	124	+ 81
Military and naval	145	204	− 29
Highway	1,500	1,233	+ 22
Sewer and water	458	331	+ 38
Misc. public service enterprises	106	117	− 9
Conservation and development	615	396	+ 55
All other public	150	116	+ 29

SOURCE: Joint estimates of the Dept. of Commerce and the Dept. of Labor.

McNeil Engineering Has Acquired Stock Of Cleveland Crane

Cleveland

• • • **McNeil Machine** & Engineering Co., Akron, Ohio, has acquired more than 90 pct of the capital stock of Cleveland Crane & Engineering Co. and plans to merge the two operations under the McNeil name.

McNeil Machine & Engineering Co., which has been negotiating for Cleveland Crane for almost 2 yr, was organized in 1862 as the J. C. McNeil Co. C. P. Safreed is president; A. S. Michelson is vice president and treasurer; T. Henry Williams, secretary, and Frank H. Jennings, assistant secretary-treasurer. The present owners acquired the firm in 1936.

Originally McNeil made heating and power boilers, but in the early 1900's entered the paper rubber machinery field. In recent years it has been engaged almost exclusively in the development and sale of machinery for curing tires and tubes. Sales during the war years were $9 million from a $90,000 yearly rate before 1936.

Cleveland Crane was organized in 1899 as Cleveland Crane & Car Co. Its principal products at the present time are overhead materials handling equipment, presses and shears. Shipments in 1948 were over $7 million.

Herbert T. Florence, president of Cleveland Crane, and the executives associated with him, will continue to operate the business and after the merger the company will be known as the Cleveland Crane Div. of McNeil Machine & Engineering Co.

Gets Plant in Scotland

New York

• • • **Burroughs** Adding Machine Co. has acquired a plant in Scotland as part of the company's expansion program in Europe, according to John S. Coleman, president. The new 150,000 sq ft plant is now under construction 16 miles from Glasgow. The plant will go into operation this year and is expected to reach full production in 1950.

MACHINE TOOLS

. . . News and Market Activities

December Machine Tool Shipments Expected to Hit 1948 High

Some ECA Business Is Coming Through; Foreign Orders Also a Source of Hope

° ° °

• • • **Optimism in** small doses was being dispensed for the asking in some segments of the machine tool industry this week as preliminary reports indicated that December machine tool shipments will hit a 1948 high of $35 million when the final tally is made.

Also, ECA business is coming through. Distribution of these orders in the industry is spotty at the present time, but it is known that one plant has more than $9 million in orders from this source on the books. Other plants are quoting on a lot of equipment for the defense program, nothing startling, according to company sources, but good solid business if it comes through.

Apart from the government programs, the new firm order pattern does not bear out more than modest optimism. Foreign shipments in December doubled the November total, and the new order total will probably come out about the same. Foreign orders will be down along with unfilled orders. Cancellations during December were up.

Much the same pattern is evident in the contract tool and die shops. Business is a little better than it was, with new business stemming primarily from the aircraft industry and government arsenals. Appliance manufacturers, it is reported, are bringing out new models, which will require special tooling. Tool and die shops' backlogs are down, but not greatly changed from the year end. Employment is down about 8 pct under the corresponding period of 1948.

In Detroit there are few new machine tool developments. A possible exception is the recent decision to increase the capacity of the Oldsmobile high compression engine plant by 50 pct. Olds had previously indicated that its output could be boosted substantially without increasing the capacity of all stations along the line. However, the new order on which quotas are now being requested is expected to be substantial.

Current reports indicate that tooling is just about completed for the Packard automatic transmission. Most observers here expect the Packard transmission will be introduced during March or April. Rumors about a new automatic transmission for Lincoln were heard again this week, but the project is still very indefinite. The Saginaw transmission plant at Saginaw is very active, but no new developments are reported.

Tool shops in the Detroit area report a slight pickup during the past few weeks, but the present volume remains far below the activity which has persisted here for the past several years. A substantial portion of the new work is for 1950 car models.

Elsewhere, reliable sources in the trade are predicting that if a business recession of any depth develops, the industry will be faced with another surplus machine tool problem. Tools on lease from WAA, it is understood, would be turned back to WAA in most cases and probably added to the JANMAT reserve. Tools bought from WAA, however, at prices from 20¢ on the dollar up, might be put up for sale by plants in need of money at very attractive prices, prices that might have an effect on the sale of new machines.

Other observers believe this is simply borrowing trouble and the Defense Program and ECA as they get rolling, will take up the slack in new orders.

The break in scrap prices, including the foundry grades, will be of some help to machine tool builders owning foundries, in reducing raw material costs. Purchased castings, if the market continues to drop, should reflect the lower material costs also.

Inventory continues to give cause for concern in some machine tool plants, although buyers are operating in many cases on the basis of delivery in 2 weeks. Parts inventories are reported to be very high in some plants.

Lack of volume production will more than offset any drop in the costs of raw materials for the time being for most machine tool builders, and higher productivity by shop personnel is still the big fly in the cost ointment.

New Fan 80 Pct Efficient

Pittsburgh

• • • **A static efficiency** of 80 pct is claimed for a new centrifugal fan being introduced by Westinghouse Electric Corp. This is 2 pct higher than the efficiency of the company's former model. Westinghouse engineers believe that 80 pct marks a new high in static efficiency for this type unit.

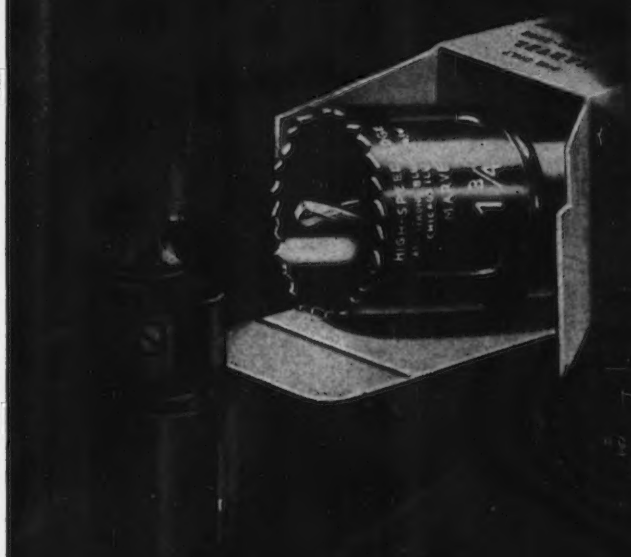
Harold F. Hagen, research director of the Sturtevant Div., which makes the fan, has been working on this project for 37 years. He says the saving from increased efficiency could amount to more than 20 pct of the fan's cost within a 5-year period. Most important design revision in the new unit is a change in the scroll—the spiral housing that surrounds the fan blades.

The fan will be available in 23 sizes, the largest of which will stand 18 ft high and be able to move 480,000 cu ft of air per min, or 1080 tons per hr. Centrifugal fans are used in power plants, industrial ventilating and air conditioning.

Metal Cutting

MARVEL SAWS

Better Machines–Better Blades



Regardless what type hack saw machines and metal-cutting band saw machines you use, **MARVEL BLADES** will improve performance. There are sound reasons why this is true; practical reasons that are easily understood and demonstrated.

MARVEL High-Speed-Edge Hack Saw Blades, with a genuine high-speed-steel cutting edge integrally welded to a tough alloy steel body, are both fast-cutting and *positively unbreakable*. This construction permits greatly increased speeds and feeds and tauter blade tensioning. Still, they last much longer than ordinary blades.

MARVEL High-Speed-Edge Hole Saws, with this same unbreakable construction and heavy-duty arbors, have the extra strength required for drill press and lathe use . . . rapidly saw holes from 3/8" to 4½" diameter thru steel of up to 1⅛" thickness.

MARVEL Band Saws are of selected quality. They come ready for use, pre-welded to size for each make and model saw. Individually boxed, they are protected against kinking, rusting or damage to teeth!

Write for Blade Catalog Sheet.

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NONFERROUS METALS

. . . News and Market Activities

Shortages of Copper, Lead and Zinc Still Restrict Operations

New York

• • • **There has been** no easing in the shortages of copper and zinc, and the lead market is easier only in a relative sense. Consumers of each of these metals have found it necessary to reduce plant operations within the limits of available supplies. Publication of an item in the *New York Times* to the effect that some purchasing men were expecting a lower copper price within 30 days due to improving supplies and curtailed demand has caused some confusion in the minds of consumers. Those who have been in the copper market in recent months consider this to be a most overoptimistic statement.

The Bingham, Utah copper mine strike was still in effect at the beginning of the week. All indications point to a long drawn out struggle between company and union on the point at issue. In the meantime, copper consumers are suffering the loss of 23,000 to 24,000 tons a month, about one-third of total domestic mine production. At the same time, the strategic stockpile is withdrawing another 10,000 tons per month. Under these circumstances, it is not likely that there will be any easing in the copper market in the first quarter, regardless of further downward developments in consuming markets.

The effect of recent changes in demand for brass mill products has been pointed up by the announcement of the American Brass Co. that its Waterbury branch goods section would be placed on a schedule of 24 and 32 hours a week caused by a drop in order volume. This plant had been on a 40 hour week basis until December when operations began to taper off. Field contacts indicate that the appliance business has begun to pick up, but observers expect it to operate at lower levels than it did throughout last year.

Expectation of Lower Copper Prices Within 30 Days Is Felt Overoptimistic

° ° °

Consumers are still trying to obtain January copper, and some have paid a premium price for it, up to 25.75¢ a lb. Most consumers have had to reduce their operations because of the lack of copper. This has served to reduce the demand for lead and zinc somewhat. Cable manufacturers who are unable to obtain enough copper are not forced to scour the market for lead. Brass mills unable to get sufficient copper find their current zinc requirements reduced.

Further price reductions have appeared in the brass and aluminum ingot markets. Buying of ingots has not picked up as expected by mid-January, and the volume of business has not been sufficient to establish an active market. Reductions of ½¢ per lb were made in brass and aluminum ingots last week. Ingot makers also reduced their buying prices for brass and aluminum scrap grades which was reflected in declines of the same amount in dealers' buying prices.

Prospects of an improved aluminum supply grow dimmer with current developments in the Northwest power situation. Bonneville power is so critically short that brownouts have been placed into effect and housewives have been asked not to use their washing machines for a few weeks. Industrial consumption of power continues to be restricted. Aluminum producers are fearful that curtailments of power may become so rigorous that it may be necessary for them to consider taking out potlines. One producer estimates that its current loss is averaging 6 million lb of aluminum per year. Current reports indicate that the snow on the mountains is very heavy. A sustained thaw would be likely to bring about a repetition of the flood conditions that shut down reduction plant last spring.

The controversy over the heavy imports of aluminum and lead from ECA nations to be sold here at gray market prices continues to rage. So far ECA has failed to make a full report of the situation that would end the confusion. Foreign governments involved in the shipments have said categorically that the reported tonnages had not been shipped. Figures of the Bureau of the Census tend to support the import tonnages reported. It is understood that high officials of ECA have dug into the facts but have so far been unwilling to release them to the press.

Nonferrous Metals Prices

	Jan. 12	Jan. 13	Jan. 14	Jan. 15	Jan. 17	Jan. 18
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Metal Powder Assn. Meets

New York

• • • **The fifth annual** meeting of the Metal Powder Assn. has been scheduled for the Drake Hotel, Chicago, April 5 and 6. Because of the popular demand and growing interest in powder metallurgy, the association has decided to follow the procedure of last year's meeting by devoting two full days to technical sessions and exhibits.

The meetings will be open to members and nonmembers alike with technical and economic papers devoted entirely to powder metallurgy being presented.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$90 to $92
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$89 to $93
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.198
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	20.00*	22.00
No. 120	19.50*	21.50
No. 123	19.00*	21.00
80-10-10 ingot		
No. 305	....	27.25
No. 315	....	24.25
88-10-2 ingot		
No. 210	....	33.00
No. 215	....	31.00
No. 245	23.75*	25.75
Yellow ingot		
No. 405	17.00*	17.50
Manganese bronze		
No. 421	....	23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	29.50-30.00
0.60 copper, max.	29.25-29.75
Piston alloys (No. 122 type)	25.50-26.00
No. 12 alum. (No. 2 grade)	25.00-25.50
108 alloy	25.50-26.00
195 alloy	25.50-26.00
13 alloy	29.50-30.00
AXS-679	25.50-26.00
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1—95 pct-95½ pct	27.00-27.50
Grade 2—92 pct-95 pct	25.75-26.25
Grade 3—90 pct-92 pct	24.75-25.25
Grade 4—85 pct-90 pct	24.00-24.50

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅝
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	20.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅜ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	....	37.18
Copper, hot-rolled	....	33.03	....
Copper, drawn	..	34.28	....
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass	....	29.24	....
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver 10 pct	....	47.17	44.77
Architectural bronze	33.42	....	....

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅜
Yellow brass	18⅞	18⅛
Red brass	20	19¼
Commercial bronze	20⅛	19⅜
Manganese bronze	18¾	17⅞
Leaded brass rod ends	18⅛	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50
No. 2 copper wire	19.50
Light copper	18.50
Refinery brass	18.25-18.50

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	15.50
No. 1 comp. turnings	15.25
Rolled brass	12.75-13.25
Brass pipe	13.25-13.75
Radiators	13.75-14.00
Heavy yellow brass	12.00-12.25
Aluminum	
Mixed old cast	15.50-15.75
Mixed old clips	15.75-16.00
Mixed turnings, dry	14.50-14.75
Pots and pans	15.75-16.00
Low copper	19.00-19.50

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18½—19
No. 2 heavy copper and wire	17½—18
Light copper	16½—17
Auto radiators (unsweated)	11½—11¾
No. 1 composition	13¾—14
No. 1 composition turnings	13¼—13½
Clean red car boxes	11 —11½
Cocks and faucets	11 —11½
Mixed heavy yellow brass	8 — 8½
Old rolled brass	10½—11
Brass pipe	12 —12½
New soft brass clippings	15 —15½
Brass rod ends	13 —13½
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcases	11½—12
2S aluminum clippings	15½—16
Old sheet & utensils	11½—12
Borings and turnings	5½— 6
Misc. cast aluminum	11½—12
Dural clips (24S)	11½—12

Zinc

New zinc clippings	10½—11
Old zinc	9 — 9½
Zinc routings	5¼— 5¾
Old die cast scrap	5¾— 6¼

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½

Lead

Soft scrap lead	18 —18½
Battery plates (dry)	10¼—10½

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5½

Miscellaneous

Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	19 —19½
Solder joints	21½—22½
Siphon tops	50 —52
Small foundry type	20½—21
Monotype	19½—20
Lino. and stereotype	19 —19½
Electrotype	17½—18
New type shell cuttings	15½—16
Hand picked type shells	6½— 7
Lino. and stereo dross	10½—11
Electro dross	7 — 7½

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel (cents per pound)	Jan. 18, 1949	Jan. 11, 1949	Dec. 21, 1948	Jan. 20, 1948
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$6.80	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.00	6.00
Special coated mfg. ternes	6.65	6.65	5.90	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: per gross ton)	Jan. 18, 1949	Jan. 11, 1949	Dec. 21, 1948	Jan. 20, 1948
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$44.61
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	49.46	49.46	49.47	43.28
No. 2, Birmingham	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	39.00
Basic del'd Philadelphia*	50.76	50.76	50.76	44.11
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	38.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese‡	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. prices quoted on Ferroalloy page.

* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$40.75	$40.75	$42.75	$40.50
Heavy melt'g steel, Phila.	42.50	42.50	44.50	45.50
Heavy melt'g steel, Ch'go	39.50	39.50	41.75	39.50
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	35.25
Low phos. Young'n	47.00	47.00	47.75	47.75
No. 1, cast, Pittsburgh	*64.00*	68.00	70.00	56.75
No. 1, cast, Philadelphia	*57.00*	62.50	65.50	59.00
No. 1, cast, Chicago	*53.50*	61.00	68.50	69.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$17.00	$17.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Jan. 18, 1949	3.75628¢ per lb.	$46.78 per gross ton	$40.92 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$40.92 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One year ago	3.22566¢ per lb.	$40.08 per gross ton	$41.83 per gross ton

	HIGH		LOW		HIGH	LOW	HIGH	LOW
1949	3.75628¢	Jan. 1	3.75628¢	Jan. 1	$46.82 Jan. 1	$46.78 Jan. 18	$43.00 Jan. 1	$40.92 Jan. 11
1948	3.75700¢	July 27	3.22566¢	Jan. 1	46.82 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.19541¢	Oct. 7	2.87118¢	Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.83599¢	Dec. 31	2.54490¢	Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢	Oct. 2	2.54490¢	Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢		2.29176¢		23.61	23.61	$19.17	$19.17
1942	2.28249¢		2.28249¢		23.61	23.61	19.17	19.17
1941	2.43078¢		2.43078¢		$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84 Nov 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

SCRAP

. . . News and Market Activities

Cast Grades Plunge; Others Resist Weakly

New York

• • • **The market continued** its downward plunge this week with some cast grades dropping as much as $8 a ton. Railroad specialties were generally off $1 to $2 a ton and No. 1 heavy melting fell off from 50¢ to $1 in some of the major market areas. The bottom appears to have fallen out of the cast market while the heavy melting grades are weak and groggy.

New sales are limited with only a few buyers in the market. A condition such as this leaves legitimate offerings by brokers to sell as the only fair appraisal of current prices.

•

PITTSBURGH—Openhearth scrap prices were unchanged and no additional sales were reported during the past week. Other grades have dropped, reflecting the generally weak tone of the market. Aside from a $4 drop in No. 1 machinery cast iron scrap, the biggest decline was a $1.50 dip in railroad specialties. Absence of sales of shoveling turnings at more than they were bought for blast furnace use cuts out the $1 premium which some openhearth turnings users were paying and dropped all turnings by $1 during the past week. The unusually large Pittsburgh delegation at the scrap convention was taken by some to indicate the market's current uncertainty. Quotations of No. 2 heavy melting steel at $40.40 to $41 last week was a typographical error. It should have read $40.50 to $41.

•

CHICAGO—In the absence of any new sales to the mills, legitimate offerings by brokers to sell last week are the only fair appraisal of the market. Dealer yard prices slipped further last week. In fact, dealers themselves offered scrap direct to two mills, both of which refused to buy. Railroad specialties continued their decline. The new sale price of malleable surprised some in the trade. They had figured that the next sale would be much closer to $50. Carnegie Illinois Steel Corp. appears to be still trying to hold a $42 floor under No. 1 industrial scrap. This controlled price, however, does not in any way reflect the market and cannot be considered a representative figure. Carnegie at the same time, plus other mills, is holding up all shipments of dealer scrap still due on old orders.

•

PHILADELPHIA—The turnings market was off by $2 a ton last week, and declines in cast scrap grades ranged from $3 to $5 a ton. Mills had not reentered the market by last week for No. 2 melting steel, an indication of their comfortable position and the possibility of a further downward movement. Turnings continue scarce in spite of the lower price. Foundries continue to lack interest in cast grades. Railroad lists last week went at prices several dollars lower. So far there is no real concern being displayed by dealers as to the ultimate stability of the market.

•

CLEVELAND—Little trading, big shipments and lower prices were in order here, and buyers professed disinterest in buying at any price. Scrap is moving and a very considerable tonnage will have been shipped by the end of this month. Brokers hint of a dip and a subsequent rise in prices, which will come up through concerted buying at the end of the month. At the moment, however, more tonnage is available than mills want to buy, a fantastic situation at this time of year with operations at their present level.

•

DETROIT—Market prices for openhearth grades are still holding in Detroit—but by the narrowest of margins. The next bonafide sale will undoubtedly send prices tumbling downward, according to informed opinion here. Meanwhile, turnings are much weaker, apparently reflecting the lower price levels in other scrap areas and the withdrawal of springboard offers. Cast grades are also responding to the law of supply and demand and the present low level of foundry operations in this area. Most local sources believe new and substantially lower price levels for practically all grades are about to be established here.

•

CINCINNATI—All grades of scrap are weaker here this week. Orders are running out and rejections are increasing to add to the general confusion. The market is upset and in a state of flux. As soon as prices appear to be temporarily stabilized locally, the market displays sympathetic weakness resulting from developments in the St. Louis and Birmingham markets. Brokers claim they can't find the market, although a major consumer bought a limited tonnage for February consumption at $36.50. Foundries are staying out of the market with minor exceptions and won't buy a pound. They refuse to make an offer. Shipments are good with orders cancellable Jan. 15, 20 and Feb. 1.

•

NEW YORK—The market continues to blow cold. Every item across the board dropped from 50¢ to $1. The heavy melting market is weak. Where it will go no one knows. But the cast grades are so weak that even the prices quoted this week are little more than nominal. The bottom had fallen completely out of the chemical boring market. One large consumer shut December shipments off, will now take what he had promised for January and that's all. No new sales are being made and any prices quoted would be strictly nominal.

•

BOSTON—The period of dullness, then weakness, and finally a crack in prices has been followed by somewhat more activity but, of course, at substantially lower quotations. No. 1 heavy melting now pay $34.40 to 37, a drop of about $2, and all along the line prices are down to about $3 in No. 1 machinery cast, which is now at a new low of $59 to $60. For the first time in many months, under the market prices of about $32 are in effect in No. 2 heavy melting, No. 1 and 2 bundles, and bushelings as compared to a market of $34.40. Shoveling turnings, machine shop turnings, and mixed borings and turnings joined the downward trend with drops of about $2.

•

ST. LOUIS—The scrap iron market in the St. Louis industrial district took its longest price drop in years, reductions ranging from $1 a ton for No. 1 heavy melting to $12 for malleable. The steel mills, who are enjoying good business, and the foundries, whose volume has slipped, are in the saddle because of a strong inventory position. Buying at the new low prices has been sparing, and mills and foundries are not taking on any more scrap even on the present basis. Bundled sheets, for the first time in years, are selling at $1 less than the No. 2 heavy melting grade because the supply in the hands of consumers is plentiful.

•

BIRMINGHAM—Openhearth grades of steel have dropped $2.50 in this area for the second time in 2 weeks and, although only limited tonnages are being bought at $35, dealers appear more concerned with getting orders than with the new price. Specialty items have dropped from $2 to $5 and prices for cast iron are on the basis of last sales. Tonnages of No. 1 cupola cast have been offered here for less than $60 but consumers remain out of the market.

•

BUFFALO—Further weakness developed in scrap in the last week with steelmaking and blast furnace grades off another dollar and No. 1 heavy melting down $2 to $45 to $46. Small tonnages were sold to consumers here in the latter range. No. 2 steel and bundles stayed at $40.25, then hit the skids again when the buyer refused to take additional tonnage at that price. At the start of the week No. 2 was quoted at $39 to $40. Shipments to mills showed better preparation and closer grading as consumers scanned their receipts more carefully. Movement was better than usual for this time of year, probably due more to the open weather than anything else. Cast scrap broke $5 to $6 with mixed yard stuff listed at $55 to $57 and No. 1 machinery at $60 to $62.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.50 to $41.00
[illegible] melting	43.50 to 44.00
No. 2 hvy. melting	40.50 to 41.00
RR. scrap rails	56.00 to 57.00
Rails 2 ft and under	59.00 to 60.00
No. 1 comp'd bundles	40.50 to 41.00
Hand bdld. new shts.	40.50 to 41.00
Hvy. axle turn.	42.50 to 43.50
Hvy. steel forge turn.	42.50 to 43.50
Mach. shop turn.	35.50 to 36.00
Shoveling turn.	37.50 to 38.00
Mixed bor. and turn.	35.50 to 36.00
Cast iron borings	38.50 to 39.00
No. 1 mach. cast	63.50 to 64.50
Mixed yard cast	59.50 to 60.00
Hvy. breakable cast	55.00 to 56.00
Malleable	69.00 to 70.00
RR. knuck. and cup.	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. leaf springs	54.00 to 55.00
Rolled steel wheels	54.00 to 55.00
Low phos.	47.50 to 48.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	39.00 to 40.00
No. 2 dealers' bundles	37.00 to 38.00
Bundled mach. shop turn.	36.00 to 37.00
Galv. bundles	35.00 to 36.00
Mach. shop turn.	32.00 to 33.00
Short shov. turn.	34.00 to 35.00
Cast iron borings	33.00 to 34.00
Mix. borings and turn.	32.00 to 33.00
Los phos. hvy. forge	46.00 to 46.50
Los phos. plates	42.50 to 44.50
No. 1 RR. hvy. melt.	43.75 to 44.25
Rerolling rails	55.00 to 60.00
Miscellaneous rails	46.00 to 47.00
Angles & splice bars	48.00 to 50.00
Locomotive tires, cut	48.00 to 50.00
Cut bolster & side frames	46.00 to 48.00
Standard stl. car axles	72.00 to 73.00
No. 3 steel wheels	47.00 to 48.00
Couplers and knuckles	47.00 to 48.00
Rails, 2 ft and under	51.00 to 52.00
Malleable	60.00 to 62.00
No. 1 mach. cast	52.00 to 55.00
No. 1 agricul. cast	50.00 to 54.00
Heavy breakable cast.	56.00 to 57.00
RR. grate bars	53.00 to 54.00
Cast iron brake shoes	55.00 to 56.00
Cast iron car wheels	56.00 to 59.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$36.00 to $36.50
No. 2 hvy. melting	36.00 to 36.50
No. 1 bundles	36.00 to 36.50
No. 2 bundles	36.00 to 36.50
Mach. shop turn.	31.00 to 31.50
Shoveling turn.	33.00 to 33.50
Cast iron borings	32.00 to 32.50
Mixed bor. & turn.	32.00 to 32.50
Low phos. 18 in. under	45.00 to 46.00
No. 1 cupola cast.	58.00 to 60.00
Hvy. breakable cast.	52.00 to 53.00
Rails 18 in. and under	58.00 to 59.00
Rails random length	52.00 to 53.00
Drop broken	63.00 to 64.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.40
No. 2 hvy. melting	32.00
Nos. 1 and 2 bundles	32.00
Bushelings	32.00
Shoveling turn.	$28.00 to 29.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	26.00 to 27.00
Cl'n cast chem. bor.	nominal
No. 1 machinery cast.	59.00 to 60.00
No. 2 machinery cast.	51.00 to 52.00
Heavy breakable cast.	50.50
Stove plate	50.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	$28.00 to 29.00
Machinery cast	58.00 to 60.00
Mixed yard cast	53.00 to 55.00
Shoveling turn.	29.00 to 30.00
Cast iron borings	31.00 to 32.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	50.00 to 53.00
Stove plate	57.00 to 58.00
Automotive cast.	58.00 to 60.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	39.00 to 39.50
Mach. shop turn.	34.00 to 34.50
Shoveling turn.	37.00 to 37.50
Mixed bor. and turn.	34.00 to 34.50
Clean cast chemical bor.	nominal
No. 1 machinery cast	56.00 to 58.00
No. 1 mixed yard cast.	55.00 to 56.00
Hvy. breakable cast.	55.00 to 56.00
Hvy. axle forge turn.	42.00 to 43.00
Low phos. acid, openhearth	45.00 to 46.00
Low phos., electric furnace	47.00 to 48.00
Low phos. bundles	45.00 to 46.00
RR. steel wheels	50.00 to 51.00
RR. coil springs	50.00 to 51.00
RR. malleable	73.00 to 74.00
Cast iron carwheels	56.00 to 58.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	37.00 to 38.00
Bundled sheets	36.00 to 37.00
Mach. shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 32.00
Locomotive tires, uncut	43.00 to 44.00
Mis. std. sec. rails	46.00 to 47.00
Steel angle bars	49.00 to 51.00
Rails 3 ft and under	52.00 to 53.00
RR. steel springs	44.00 to 45.00
Steel car axles	65.00 to 66.00
Brake shoes	46.00 to 48.00
Malleable	63.00 to 65.00
Cast iron car wheels	58.00 to 59.00
No. 1 machinery cast.	58.00 to 60.00
Hvy. breakable cast.	57.00 to 58.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	35.00
No. 2 bundles	35.00
No. 1 busheling	35.00
Long turnings	$30.00 to 32.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	29.50
Bar crops and plate	40.00 to 42.00
Structural and plate	40.00 to 42.00
No. 1 cupola cast.	60.00 to 62.00
Stove plate	60.00 to 61.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	65.00 to 68.00
Scrap rails	42.00 to 44.00
Rerolling rails	58.00 to 60.00
Angles & splice bars	40.00 to 42.00
Rails 3 ft & under	42.00 to 44.00
Cast iron carwheels	61.00 to 63.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
No. 2 bundles	38.50 to 39.00
Mach. shop turn.	34.00 to 35.00
Short shov. turn.	36.00 to 36.50
Cast iron borings	35.00 to 35.50
Low phos.	46.00 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.50
No. 2 hvy. melting	34.00 to 35.00
No. 2 bundles	34.00 to 35.00
Mach. shop turn.	28.00 to 29.50
Mixed bor. & turn.	28.00 to 29.50
Shoveling turnings	30.00 to 31.50
Machinery cast.	53.50 to 55.00
Mixed yard cast.	50.00 to 51.50
Heavy breakable cast.	47.50 to 49.00
Charging box cast.	47.50 to 49.00
Unstry. motor blks.	45.50 to 47.00
Cl'n cast chem. bor.	nominal

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	39.00 to 40.00
Mach. shop turn.	34.75 to 35.25
Shoveling turn.	36.75 to 37.25
Cast iron borings	35.75 to 36.25
Mixed bor. and turn.	34.75 to 35.25
Clean auto. cast.	59.00 to 60.00
Mixed yard cast.	55.00 to 57.00
Stove plate	55.00 to 57.00
RR. malleable	70.00 to 75.00
Small indus. malleable	44.00 to 45.00
Low phos. plate	45.00 to 47.00
Scrap rails	[illegible] 58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	53.00 to 54.00
RR. coil & leaf spgs.	54.25
RR. knuckles & coup.	54.25

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	32.50 to 33.00
Shoveling turn.	34.50 to 35.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	33.50 to 34.00
Mixed bor. & turn.	33.50 to 34.00
Low phos. 2 ft and under	44.50 to 45.00
No. 1 machinery cast.	65.00 to 67.00
Malleable	74.00 to 76.00
RR. cast.	69.00 to 70.00
Railroad grate bars	55.00 to 56.00
Stove plate	58.00 to 59.00
RR hvy melting	43.00 to 44.00
Rails 3 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	40.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

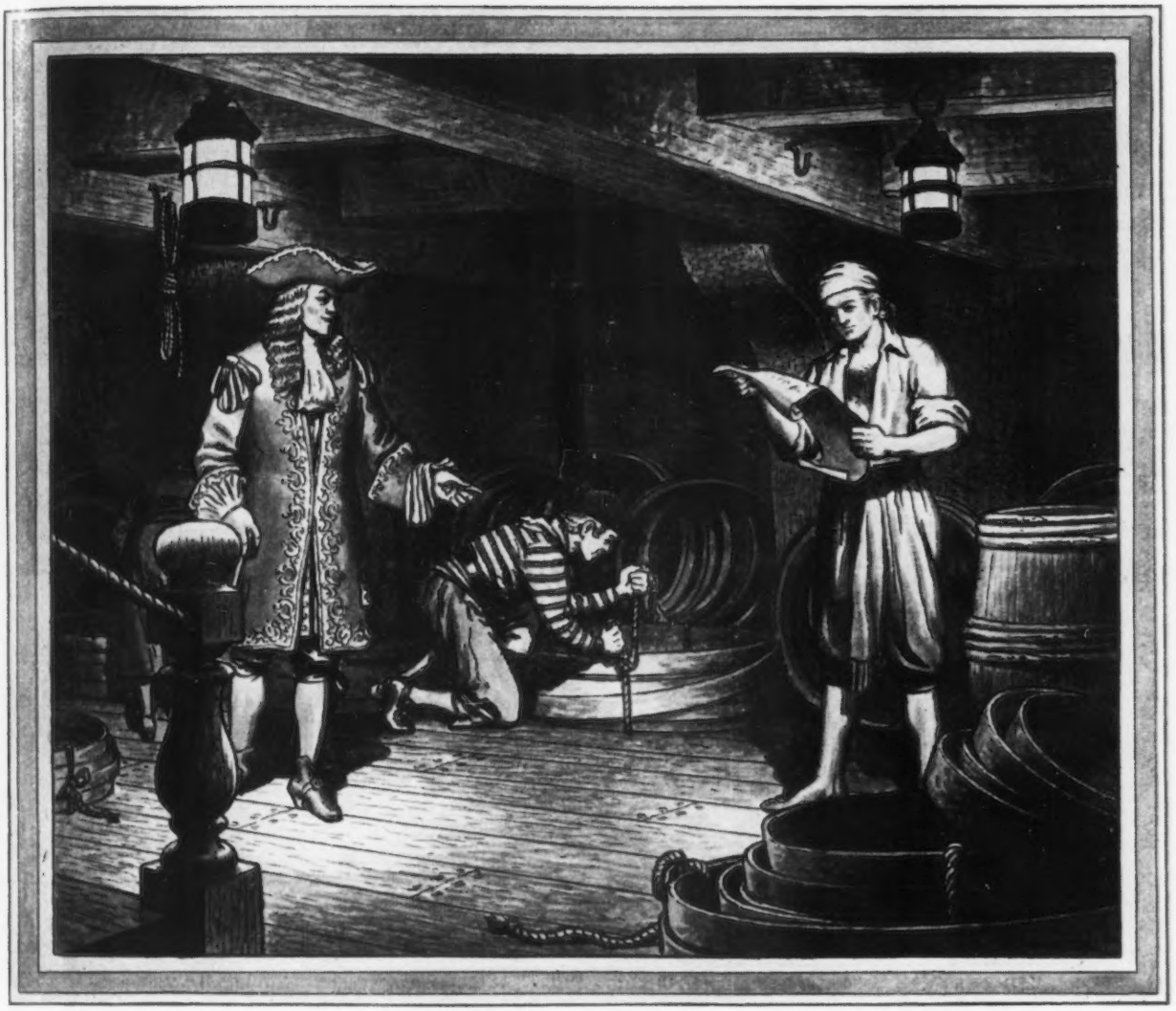
No. 1 & No. 2 hvy. melt.	$30.00 to $33.50
Elec. fur. 1 ft and under	36.50 to 40.00
No. 1 cupola cast.	40.00 to 40.50
RR. hvy. melting	30.00 to 32.50

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$48.00 to 50.00*
No. 2 cast	44.00 to 46.00*

*Ceiling Price



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25–3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren =4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. =$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45	3.40	3.45 Coatesville =3.75, Claymont =3.95 Conshohocken =3.95 Geneva =3.40, Harrisburg =6.50				3.65	3.45	4.30[16]	5.60
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville =5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.5	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50 .....
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50 .....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
CF&I and Inland, $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad 10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad 10 pct, f.o.b. Coatesville.	36.00	
Monel-clad 10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets Hot dip, 20 gage, f.o.b. Butler, Pa.	....	9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	133
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	....

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled	6.05	6.05	6.05	....	6.05	6.05	6.05	6.25	6.35
Galvanized	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	5.15	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
⅛-in.	43 to 41	20 to 18
¼-in.	46 to 44	24 to 22
⅜-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
⅛-in.	+20½	+52½
¼-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
⅛-in.	42 to 40	20½ to 18½
¼-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
⅛-in.	+16	+46½
¼-in.	+ 9½	+39½
1 to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD	Gage	Seamless		Electric Weld	
in.	BWG	H.R.	C.R.	H.R.	C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quentities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	19
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	*Base price per net ton*
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight handling charges or taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	31.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	28.00¢
Manganese	60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa. f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅜-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 36.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5 58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7 15-7.30	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.47	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5 15-5.34	5.70-5.95	9.14-9.66	9.29-9 89	11.05	11.30
Buffalo	4.85	5.75	7.65	5.56	6.35	5.35	5.10	5.05	5.90	9.70	9.95	11.15	11.40
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[5]	5.82-6.21[5]	6.97-7.65	5.25-5.62[5]	6.31	5.50-5.71[5]	5.30-5.47[5]	5.30-5.62[5]	6.06-6.17[5]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7 29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.71	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92	....	9 18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	6.36	6.45	5.05[11]	6.36	5.25[11]	5.00[11]	5 00[11]	6.66	....	....	....	....
Houston	6.40	....	8.80	6.75	....	6 35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7 95-8 90	6.60-6.66	9.35[5]	6.10-7 40	5.75-5.90	6.05	7 85[15]-8 45	10.90	10.85	12.40	12.65
San Francisco	5.95[5]	7.15[2]	8 25-8.90	6.75[5]	8.25	6.30-7.60	5 90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2]-8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65-8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-8.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	42 88	43.38	.....	.....	.....
Buffalo	47 00-47.25*	47 00-47.25*	47 50-47.75*	.....	.....
Chicago	46 00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47 00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46 50	47.00	.....
Everett	.....	52.75	53.25	.....	.....
Granite City	47.90	48 40	48.90	.....	.....
Ironton, Utah	62.00	62 50	.....	.....	.....
Lone Star, Texas	.....	75.00†	.....	.....	.....
Neville Island	46 00	46 50	46.50	.....	.....
Provo	46 00	46.50	.....	.....	.....
Sharpsville	46 00	46.50	46.50	47.00	.....
Steelton	48 00	48.50	49.00	49.50	54.00
Struthers, Ohio	46 00	.....	.....	.....	.....
Swedeland	50 00	50.50	51.00	51.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	.....	.....	.....	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	52.75	53.25	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	.....	.....	.....	.....
Cincinnati	Birmingham	6.09	48 97	49.46	.....	.....	.....
Jersey City	Bethlehem	2.39	50.39	.....	.....	.....	.....
Los Angeles	Provo	6.93	52.93	53.43	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Provo	6.93	52.93	53.43	.....	.....	.....
Seattle	Provo	6.93	52.93	53.43	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Weland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Ci	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr. 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%. f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.90¢
Ton lots	9.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25